Owners Manual

Introduction

Dear CrossRoads Owner,

Thank you for purchasing a CrossRoads RV Company product. Your decision to own a CrossRoads is what drives our efforts everyday, and we appreciate your vote of confidence.

We want the experience with your new travel-trailer or fifth-wheel to be enjoyable. To help get you started, please take a few minutes and review our owner's manual. It is pretty straight forward and will help you understand many of the functions and required maintenance of your RV.

On behalf of everyone at CrossRoads RV Company, we hope you will enjoy our product as much as we have enjoyed creating it for you.

Your CrossRoads RV Company Team

1115 West Lake St. – Topeka, IN 46571
Phone: (260) 593-2866 – FAX (260) 593-2815

www.crossroadsrv.com

CrossRoads RV Company has provided this manual solely for the purpose of providing instructions about the operation and maintenance of its recreational vehicle. Nothing in this manual creates any warranty, either express or implied.

The Limited Warranty and limited warranties issued by the component manufacturers require periodic service and maintenance, and the owner's failure to provide these services and / or maintenance may result in loss of warranty coverage for that item. The owner should review CrossRoads RV Company's limited warranty and the warranties of all other manufacturers.

Instructions included in this manual are for operating some components, which may be optional on your vehicle. This manual is devoted to instructions on fifth-wheels and travel-trailers.

We hope you have many years of vacationing pleasure.

This manual is based on the latest information available at the time of publication. Due to continuous product development and improvements, CrossRoads RV Company reserves the right to make changes in product specifications and components without prior notice.

Date 4-2011

Danger, Warning, Caution and Note Boxes

We have provided many important safety messages in this manual. Always read and obey all safety messages.

DANGER indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

CAUTION used without the safety alert symbol indicates a potentially hazardous situation that, if not avoided, may result in property damage.

Important information regarding the maintenance of your recreational vehicle.

Terms and Symbols Used

(Optional)

This denotes items that may be an option on all or particular models. Additionally, some optional items can only be included during the manufacturing phase and cannot be added at a later date.

The inclusion of optional items does not imply or suggest the availability, application suitability or inclusion for any specific unit.

Reporting Safety Defects

If you believe that your vehicle has a defect which could cause a crash or could cause injury or death, you should immediately inform the National Highway Traffic Safety Administration (NHTSA) in addition to notifying CrossRoads.

If NHTSA receives similar complaints, it may open an investigation, and if it finds that a safety defect exists in a group of vehicles, it may order a recall and remedy campaign. However, NHTSA cannot become involved in individual problems between you, your dealer, or CrossRoads.

To contact NHTSA, you may either call the Vehicle Safety Hotline toll-free at 1-888-327-4236 (TTY: 1-800-424-9153); go to http://www.safercar.gov; or write to:

Administrator
NHTSA
1200 New Jersey Avenue S.E.
Washington, DC 20590

You can also obtain other information about motor vehicle safety from http://www.safercar.gov.

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Important Safety Precautions

You'll find many safety recommendations throughout this section, and throughout this manual. The recommendations on these pages are the ones we consider to be the most important.

Do Not Allow Passengers to Ride in the Trailer During Travel

The transport of people puts their lives at risk and may be illegal. The trailer does not have seat belts, therefore, it is not designed to carry passengers.

Reducing Fishtailing or Sway

Sway or fishtailing is the sideways action of a trailer caused by external forces. Excessive sway of your travel trailer can lead to the rollover of the trailer and tow vehicle resulting in serious injury or death. Be sure to follow the instructions and warnings as outlined on page 16.

Mold

There are mold and mold spores throughout the indoor and outdoor environment. There is no practical way to eliminate all mold and mold spores in the indoor environment; the way to control indoor mold growth is to control moisture (see page 12).

Towing and Weight Distribution

Weight distribution is an important factor when loading your fifth wheel and travel trailer (or motorhome). A recreational vehicle with the cargo distributed properly will result in efficient, trouble-free towing (see page 18).

Formaldehyde

Formaldehyde is an important chemical used widely in building materials and numerous household products. It is also a by-product of combustion and certain other natural processes. Thus, it may be present inside the trailer with some individuals being sensitive to it. Ventilation of the unit normally reduces the exposure to a comfortable level (see page 62).

Generator Safety

Do not operate the generator in an enclosed building or in a partly enclosed area such as a garage. Nor should the generator be operated while sleeping. Be sure to follow all instructions and warnings in this manual and the manual provided by the generator manufacturer (see page 27).

Lug Nut Torquing

Being sure wheel mounting nuts (lug nuts) on trailer wheels are tight and properly torqued is an important responsibility that trailer owners and users need to be familiar with and practice. Inadequate and/or inappropriate wheel nut torque (tightness) is a major reason that lug nuts loosen in service. Loose lug nuts can rapidly lead to a wheel separation with potentially serious safety consequences (see page 53).

Appliances and Equipment

The appliances (stove, refrigerator, outdoor grills, etc.) and equipment (hot water heater, furnace generator, etc.) typically operate on propane gas. Propane gas is flammable and is contained under high pressure. Improper use may result in a fire and/or explosion. Be sure to follow all instructions and warnings in this manual (see page 26-29) as well as the specific owners' manuals of the appliances and equipment.

Tire Safety

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Underinflated tires and overloaded vehicles are a major cause of tire failure.

For more information on tire safety, please see page 61.

Chapter 1: Owner and Dealer Responsibilities

As the owner of a new recreational vehicle, you are responsible for regular care and proper maintenance. Proper maintenance will help avoid situations where the Limited Warranty will not cover items due to neglect. Maintenance services should be performed in accordance with this manual, as well as, the corresponding manufacturer's warranties on components included within your coach.

As the owner it is your responsibility and obligation to return the recreational vehicle to an authorized dealer for any repairs and service that may be required. Your CrossRoads dealer is responsible for proper service before delivery and will have a continued interest in your satisfaction. Therefore, we recommend that warranty and maintenance services be performed by your CrossRoads Dealer.

Owner's Responsibilities

1. Proper care and maintenance as outlined by this manual and the corresponding component warranty package
2. Returning your vehicle to an authorized dealer for any repairs or service that is required
3. Reviewing the information contained within this manual and all supplied component information

Dealer Responsibilities

1. Orient and familiarize the customer with the operation of all systems and components of the new recreational vehicle
2. Explain and review the Limited Warranty provisions to the customer
3. Assist the customer in completing all necessary registrations and warranty cards for your new vehicle and assist in locating serial numbers if they wish
4. Instruct the customer on how to receive local and out of town service on the vehicle and its separately warranted components, whether in or out of warranty
5. Service all CrossRoads RV Company products
6. Fill out and Mail Warranty Registrations within (30) thirty days from the date of delivery

CROSSROADS RV COMPANY

For Travel Trailers and Fifth Wheels manufactured by CrossRoads RV, (CrossRoads") sold in the United States and Canada by authorized CrossRoads dealers.

LIMITED WARRANTY

CrossRoads warrants that it will repair or replace defect in material and workmanship in the covered components of the recreational vehicle for the period identified in the section of this limited warranty entitled “Length of Warranty”. This Limited Warranty extends only to the first retail purchaser and begins on the date of original retail delivery, or the date the recreational vehicle is first placed into service (whichever occurs first). This limited warranty varies by product brand, please reference your predelivery and consumer acceptance declaration form signed at the dealership for the length of your warranty. This limited warranty extends from such date for any structural defects, which is defined as the subceiling, subfloor, or side wall sagging, warping, rotting or breaking loose. Structural defects also include wiring harness shorts, but does not include blown fuses, light bulbs, TVs, radios or other electrical equipment. Written notice of a defect must be given to the selling dealer or CrossRoads not later than ten (10) days after the expiration of the warranty. Warranty repairs, if required, will be made without charge after your recreational vehicle is taken to the dealer or manufacturing plant location. All owners must be properly registered with CrossRoads RV to be considered for eligibility.

You are responsible for normal maintenance as described in the owner’s manual. If a problem occurs which you believe is covered by this Limited Warranty, you must contact an authorized CrossRoads dealer, giving sufficient information to resolve the matter. You must deliver the recreational vehicle to the dealer or manufacturing plant location for warranty service. If the dealer is unable or unwilling to resolve a problem which you are convinced is covered by this Limited Warranty, you should contact the manufacturing plant at the address listed in the front of this manual and provide us with a description in writing of the problem and the attempts to resolve the problem. Upon receipt of notice of a covered claim, where the dealer was unable or willing to resolve the problem, we will repair or replace the parts necessary to correct defects in material or workmanship of structural items covered by this Limited Warranty, or will take other appropriate actions as my be required.

WARRANTY DISCLAIMERS

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, AND IN LIEU OF ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF CROSSROADS. IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IF ANY, GIVEN BY LAW, SHALL BE LIMITED TO AND NOT EXTEND BEYOND THE DURATION OF THE WRITTEN LIMITED WARRANTY. NO PERSON HAS THE AUTHORITY TO ENLARGE, AMEND, OR MODIFY THIS LIMITED WARRANTY.

CROSSROADS WILL NOT BE RESPONSIBLE OR LIABLE FOR LOSS OF USE OF THE RECREATIONAL VEHICLE, ON-SITE SERVICE CALLS OR SERVICE CHARGES, LOSS OF TIME, INCONVENIENCE, EXPENSES FOR GASOLINE, TOWING CHARGES OR TRANSPORTATION COSTS, LOSS OF USE, RENTAL OF SUBSTITUTE EQUIPMENT, TELEPHONE, TRAVEL, LODGING, DAMAGE OR LOSS TO PERSONAL PROPERTY, LOSS OF REVENUES OR OTHER COMMERCIAL LOSS, OR ANY OTHER SPECIAL OR

CONSEQUENTIAL DAMAGES OF ANY KIND OR NATURE RESULTING FROM ANY DEFECT IN THE RECREATIONAL VEHICLE.

ANY ACTION TO ENFORCE THIS LIMITED WARRANTY OR ANY IMPLIED WARRANTY SHALL NOT BE BROUGHT MORE THAN ONE (1) YEAR AFTER THE EXPIRATION OF THE TERM OF THIS LIMITED WARRANTY.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY. FURTHER SOME STATES DO NOT ALLOW A REDUCTION IN THE STATUTE OF LIMITATIONS SO THE ABOVE REDUCTION MAY NOT APPLY.

WARRANTY EXCLUSIONS

THIS LIMITED WARRANTY AND THE OBLIGATIONS STATED HEREIN SHALL NOT APPLY TO:

- Equipment, products, components, appliances, or accessories not manufactured by CrossRoads whether or not warranted by another person or entity, including but not limited to, tires, batteries, washer, dryer, and other installed equipment or accessories;
- Trailers used for business, rental, commercial, residential, or disaster relief purposes, or any purposes other than recreational travel and family camping;
- Trailers which are not originally sold through an authorized CrossRoads dealer (i.e. sold through auction, repossession, salvage or an otherwise “distressed” condition);
- Damage or loss caused in whole or in part by the acts or omissions of any kind by any person or entity other than CrossRoads;
- Damage or loss caused in whole or in part by the misuse, abuse, neglect, theft, vandalism, insect infestation, rodent damage, product modification, improper customer or dealer installation, incorrect line voltage, unauthorized repair or failure to follow instructions supplied with the recreational vehicle;
- Routine maintenance including, without limitation, caulking, re-caulking and waxing of the body of the recreational vehicle, tightening screws, brakes, latches, locks, combustion systems, changing fuses, or light bulbs, and maintaining the air conditioning and heating systems;
- Minor adjustments to doors and drawers beyond 90 days after retail sale;
- Damage or loss caused in whole or in part by the unauthorized attachments, modifications or alterations to the structure, body, pin box, or frame of the recreational vehicle including but not limited to trailer hitches for towing, or platforms for supporting cargo;
- Any upholstery damage including, but not limited to tears, punctures or misuse;
- Fading, discoloration or dulling of any and all fabrics, interior or exterior plastics or fiberglass, sheet metal, front and rear caps, graphics, striping, decals or labels;
- Normal deterioration due to wear or exposure;
- Damage or loss caused in whole or in part by exposure to natural atmospheric elements, corrosive chemicals, ash or fumes generated or released by vehicles, collision, road hazards, rock chips, condensation, or any other source;
- Damage or loss caused in whole or in part by the overloading or the improper balancing of the load;
- Damage or loss caused in whole or in part by the willful or negligent acts of the driver of the vehicle pulling the recreational vehicle, an accident involving the recreational vehicle the condition of any road surface over

which the recreational vehicle is pulled, or the striking or driving over a curb or any other object;

- Damage or loss to the recreational vehicle caused in whole or in part by the tow vehicle selected by the owner to pull the recreational vehicle including but not limited to the improper selection or installation of towing hitch on tow vehicle;
- Any injury, loss or damage, beyond warranty repairs, due to mold or fungi;
- Damage or loss caused in whole or in part by the owner's operation, use, or misuse of the tow vehicle;
- Any and all damage or loss to the owner's tow vehicle;
- Wheel alignment and balancing of tires;
- Damage to electronics due to voltage issues are not covered under warranty;
- Representations made by any person (including your dealer) beyond those stated in this Limited Warranty;
- Any trailer licensed, registered, or primarily used outside the USA or Canada; and
- Any incidental and consequential damages including, but not limited to, transportation, fuel, food, lodging, telephone calls, towing charges, bus and taxi fares or car rentals, on-site service calls, as well as commercial use and loss of use.
- Chemical off-gassing is not a "defect" and is not covered by the warranty.
- Damage or loss caused by failure to seek and obtain repairs in a timely manner.

Length of Warranty

WARRANTIES PER PRODUCT LINE

Rushmore	2 + (5 year *structural)*
Cruiser	2 + (5 year *structural)*
Hampton	2 year
SlingShot	2 year
Sunset Trail	2 year
Zinger	2 year

*Yearly inspections are required to qualify for the five year structural warranty. Failure to submit proper documentation to CrossRoads on a yearly basis will result in cancellation of the five year structural warranty. The inspection certificate form can be found on the last page of this manual.

CROSSROADS RESPONSIBILITY
Please note the distinction between "defects" and "damage" as used in this Limited Warranty: "defects" are covered because CrossRoads is responsible; on the other hand, we have no control over "damage" caused by such things as collision, misuse and lack of maintenance which occurs after the recreational vehicle is delivered to the owner. Therefore, "damage" for any reason which occurs after the recreational vehicle is delivered is not covered under this warranty. Maintenance services are also excluded from the warranty because it is the owner's responsibility to maintain the recreational vehicle.

CrossRoads does not undertake responsibility to any owner beyond the original cost of the recreational vehicle to CrossRoads or for any

Please have the following available when you call:

•Vehicle Identification Number (17 digit Serial#- begins with 4V0)
•Model #
•Date of Purchase
•Description of the problem
•Previous repair history and location (if applicable).

undertaking, representation, or warranty made by any dealer beyond those expressed herein.

OWNER RESPONSIBILITY

It is the responsibility of the owner to maintain the recreational vehicle as described in the Care and Maintenance section of the Owner's Manual including taking whatever preventative measures necessary to maintain the exterior sealants of the unit and to prevent foreseeable secondary moisture or water damage to the unit from rain, plumbing leaks, condensation and other natural accumulation of water in the unit. Examples of secondary damage include, but are not limited to, stained upholstery, carpeting or drapes, mold formation and growth, furniture cabinetry or floor deterioration, etc. Mold is a natural growth given certain environmental conditions and is not covered by the terms of this Limited Warranty.

HOW TO OBTAIN WARRANTY SERVICE

To obtain warranty service the owner must deliver the recreational vehicle to an authorized CrossRoads dealer (with proof of purchase and freight prepaid) within a reasonable time after discovery of the defect within the warranty period. All shipping or towing expenses incurred in transporting the recreational vehicle for warranty service shall be owner's responsibility. Upon requesting the warranty services you will be asked for:

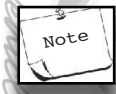
(a) Your name
(b) Date of purchase
(c) CrossRoads vehicle ID number
(d) An explanation of the anticipated warranty claim

Appliance and Component Warranty Service/Administration – Appliance and component manufacturers may or may not provide their own warranties. These warranties are separate from the CrossRoads Limited Warranty and constitute the only warranty for those specific appliances and components. The terms, conditions and warranty periods of these items may vary from the CrossRoads Limited Warranty. For the appliance and component manufacturers providing warranties, CrossRoads does, however, administer those warranties during the term of this Limited Warranty except for tires, batteries, and generators. All warranty service claims on components may therefore be directed during this Limited Warranty to CrossRoads. After the period, all appliance and component warranty claims must be directed to the respective appliance and component manufacturers. CrossRoads is not warranting any appliance or components and is only representing that it is authorized to administer the services for such products. In no way shall CrossRoads Limited Warranty be modified or amended by CrossRoads providing service for appliances and components.

If the dealer is unable to resolve any warrantable issues or for assistance in arranging repairs, please contact: Customer Service Department CrossRoads RV Company 1115 West Lake Street, Topeka, Indiana 46571. Telephone Number (260) 593-2866. Upon receipt of notice of a claim, where the dealer was unable or unwilling to resolve the problem, either an alternate dealer or the manufacturing plant will repair or replace any parts necessary to correct defects in material or workmanship or will take other appropriate action as may be required.

THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY FROM STATE-TO--STATE

Please refer to the last page in this manual for yearly inspection sheet and service certification.



Please note, your CrossRoads RV Company Limited Warranty covers warrantable repairs that are performed by an authorized CrossRoads RV Company dealer at their service center or facility only. It is important for the owner to know that if you are unable to bring your unit in for repairs, CrossRoads RV Company is not responsible for any costs incurred for the service call charge, or time accrued to come out to your unit. Your unit is a recreational vehicle and not intended, nor manufactured, as a permanent residence.

CAUTION

Tow Vehicle Disclaimer

In connection with the use and operation of CrossRoads recreational vehicles, CrossRoads customers and owners of CrossRoads recreational vehicles are solely responsible for the selection and proper use of tow vehicles. All customers should consult with a motor vehicle manufacturer or dealer concerning the purchase and use of suitable tow vehicles for CrossRoads products, CrossRoads further disclaims any liability with respect to damages which may be incurred by a customer or owner of CrossRoads recreational vehicles as a result of the operation, use or misuse of a tow vehicle. NOTE: CROSSROADS LIMITED WARRANTY DOES NOT COVER DAMAGE TO THE RECREATIONAL VEHICLE OR THE TOW VEHICLE AS A RESULT OF THE OPERATION, USE OR MISUSE OF THE TOW VEHICLE.

Inspection

To assist you in avoiding problems, CrossRoads RV Company requests that each dealer review the limited warranty and inspect the unit along with you. The dealer has been provided with a pre-delivery checklist. Review this checklist with the dealer. Do not sign the checklist until this review is complete and any questions about anything you do not understand have been answered.

Unit Information Packet

In addition to this Owner's Manual, a unit information packet is located within your new recreational vehicle. Inside the packet are product manuals and information on systems and equipment in the coach. Individual product warranty registrations accompany this information and should be completed and mailed promptly. Some components in this manual or packet may be components of a differing product line and / or are optional equipment. Inclusion of these items does not suggest that they are or may be available for a specific recreational vehicle.

Owner Registration

As a convenience to you, the owner registration form is completed at the dealership at the time of delivery. After an owner signs this form, the dealer will send the completed form to CrossRoads RV Company within 30 days. Please make sure this form is completed and signed prior to leaving the dealership.

Obtaining Warranty Service

CrossRoads RV Company recommends obtaining service from your dealer or the nearest authorized repair facility. Service must be obtained within a reasonable time after discovery of the defect and prior to the applicable warranty expiration period. If assistance is needed in locating an authorized repair center, please go to the 'Dealer Locator' on our website.

Get To Know Your Unit Before Heading Out

Throughout the manufacturing process, your recreational vehicle has been inspected by qualified inspectors and then again at the dealership. As the owners, however, you will be the first to camp and extensively use every system. CrossRoads RV Company wants the first camping experience to be happy one and recommends a "Trial Camping Experience" before heading out. Plan a weekend in the yard or driveway and really camp in your unit.

By camping for several days, full-time in your unit, you will have the opportunity to use and become accustomed to the systems within your unit and find out what items are needed/ not needed while camping. Note any questions that arise, difficulties encountered or problems that occur. After your trial, call your dealer and ask any questions that have arisen. Getting to know your unit before the first adventure can save a lot of frustration and leave more time for fun!

If You Need to Make an Appointment

Call Ahead

Give thought to an appointment time and call ahead. Mondays and Fridays are generally the busiest times at a dealer's service center, as are right before seasonal holidays.

Be Prepared

If warranty work is to be done, please have a copy of your warranty paperwork available and provide the service center with any helpful information on past repairs that may pertain and help the technicians in diagnosing the problem.

Make a List

Have a list ready and be reasonable with repair expectations. Some repairs may require special order parts or parts shipped from a manufacturer. Explain what you would like to have done over the phone or stop by ahead of time so that you and the service manager can discuss possible repair times.

While Waiting

Drop your unit off if possible. If you wait on your repair, do not be surprised if you cannot enter the repair area. Many insurance policies prohibit customers or non-personnel from entering into the work area for safety reasons.

Inspecting Your Repairs

CrossRoads RV Company and your dealer want you to be satisfied with any repair. After a repair is performed, inspect thoroughly. Check off your list and go over the repairs with the service center representative. Once satisfied, sign the CrossRoads RV Company Warranty Claim. In the event a problem should reoccur after you have left the dealership, contact the repair center or CrossRoads RV Company as soon as possible, so that the situation can be resolved expediently.

Chapter 2: Effects of Prolonged Occupancy

Your recreational vehicle was designed primarily for recreational use and short-term occupancy. If you expect to occupy the coach for an extended period, be prepared to deal with condensation and the humid conditions that may be encountered. The relatively small volume and tight compact construction of modern recreational vehicles means that the normal living activities of even a few occupants will lead to rapid moisture saturation of the air contained in the fifth-wheel and the appearance of visible moisture, especially in cold weather.

Just as moisture collects on the outside of a glass of cold water during humid weather, moisture can condense on the inside surfaces of the recreational vehicle during cold weather when relative humidity of the interior air is high. This condition is increased because the insulated walls of a recreational vehicle are much thinner than house walls. Estimates indicate that a family of four can vaporize up to three gallons of water daily through breathing, cooking, bathing and washing.

Unless the water vapor is carried outside by ventilation or condensed by a dehumidifier, it will condense on the inside of the windows and walls as

Remember, your trailer is not designed, nor intended, for permanent housing. Use of this product for long-term or permanent occupancy may lead to premature deterioration of structure, interior finishes, fabrics, carpeting and drapes. Damage or deterioration due to long-term occupancy may not be considered normal and may, under the terms of the warranty, constitute misuse, abuse or neglect and may therefore reduce the warranty protection.

If using a dehumidifier, please read and follow all manufacturer instructions and recommendations for use and cleaning.

moisture or in cold weather as frost or ice. It may also condense out of sight within the walls or the ceiling where it will manifest itself as warped or stained panels. Appearance of these conditions may indicate a serious condensation problem. When you recognize the signs of excessive moisture and condensation in the coach, action should be taken to minimize their effects.

To Avoid Condensation Problems, Follow These Tips

- Allow excess moisture to escape to the outside when bathing, washing dishes, hair- drying, laundering and using appliances and non-vented gas burners.
- Always use the vent hood when cooking.
- Keep the bathroom door closed and the vent or window open when bathing and for a period of time after you have finished.
- Do not hang wet clothes in the coach to dry.
- In hot weather, start the air conditioner early as it removes excess humidity from the air while lowering the temperature.
- Keep the temperature as reasonably cool during cold weather as possible. The warmer the vehicle the more cold exterior temperatures and warm interior temperatures will collide on wall surfaces creating condensation.
- Use a fan to keep air circulating inside the vehicle so condensation and mildew cannot form in dead air spaces. Allow air to circulate inside closets and cabinets (leave doors partially open). Please keep in mind that a closed cabinet full of stored goods prevents circulation and allows the exterior temperature to cause condensation.
- The natural tendency would be to close the vehicle tightly during cold weather. This will actually compound the problem. Simply put, you need to remove some of the warm air and allow some cool outside air to get inside the vehicle so the furnace will not recycle the humid interior air.
- Use fluorescent ceiling lights and minimize prolonged use of incandescent lights, which produce heat and contribute to condensation in the roof above the ceiling lights.

About Molds

What are molds?

Molds are microscopic organisms that naturally occur in virtually every environment, indoors and out. Outdoors, mold growth is important in the decomposition of plants. Indoors, mold growth is unfavorable. Left unchecked, molds break down natural materials such as wood products and fabrics. According to the Center for Disease Control, exposure to damp and moldy environments may cause a variety of health effects, or none at all. Some people are sensitive to molds. For these people, molds can cause nasal stuffiness, throat irritation, coughing or wheezing, eye irritation, or, in some cases, skin irritation. People with mold allergies may have more severe reactions. Immune-compromised people and those with chronic lung illnesses, such as obstructive lung disease, may get serious infections in their lungs when they are exposed to mold.

What factors contribute to mold growth?

For mold growth to occur, temperatures indoors or outdoors must be between 40 degrees and 100 degrees Fahrenheit and there must be a

source of moisture such as humidity, standing water, damp materials, etc. Indoors, the most rapid growth occurs with warm and humid conditions.

How can mold growth be inhibited?

By controlling relative humidity, the growth of mold and mildew can be inhibited. In warm climates, use of the air conditioner will reduce the relative humidity. Vents are located in the bathing and cooking areas and constant use is advised during food preparation and bathing even during colder weather. Additionally, opening a window during these activities will assist in ventilation. In extremely humid conditions, using a dehumidifier can be helpful.*

Frequent use of your RV or cleaning regularly is an important preventive measure. Further, any spills should be wiped up quickly and dried as soon as possible. Avoid leaving damp items lying about. On safe surfaces, use mold or mildew killing cleaning products. Check sealants regularly, and reseal when necessary to avoid water leaks. Proper preventive maintenance to the RV and its accessories, as described both in this manual and in accompanying literature, will provide the best protection to the RV.

For more information of controlling moisture in the RV, please read, “Tips to Controlling Condensation,” located in this manual.

*If using a dehumidifier, please read and follow all manufacturer instructions and recommendations to the use and cleaning of the dehumidifier.

Chapter 3: Towing and Leveling

Towing Guidelines

Weight distribution is an important factor when loading your fifth-wheel and travel-trailer. A recreational vehicle with the cargo distributed properly will result in efficient, trouble-free towing. Loading the coach as evenly as possible and then weighing the loaded RV can accomplish proper weight distribution. Keep heavier items as low as possible and distribute evenly (front to back and side to side). Securing your possessions can prevent damage from shifting during towing and maintain the weight distribution balance achieved during preparation for travel.

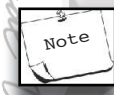
You must not exceed the GVWR or GAWR of the unit (see definitions). To verify GVWR, total the loaded hitch and axle weights. If this total exceeds GVWR, you must remove items until the vehicle weight is within this limit. You can verify that the coach’s axles are not overloaded by comparing the loaded axle weight with the GAWR. If the reading is above this limit, redistribute the item load.

Finally, make sure the pin weight of the loaded fifth-wheel falls within the limits of the tow vehicle.

Weight Ratings - Definitions

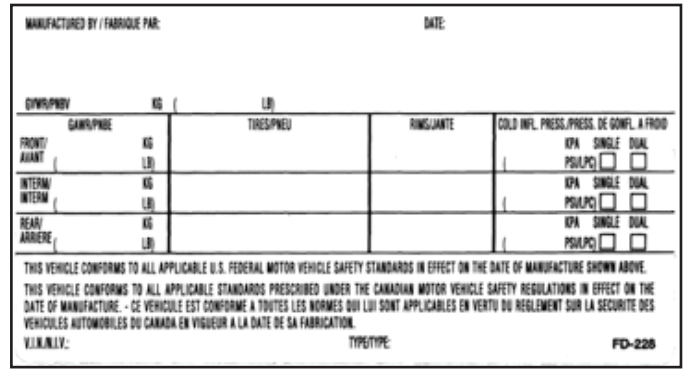
GVWR (Gross Vehicle Weight Rating)

The maximum permissible weight of this coach when fully loaded. It includes all weight at the unit’s axle(s) and tongue or pin.



Passengers are not permitted in the coach while it is in motion.

UVW (Unloaded Vehicle Weight)


MANUFACTURED BY / FABRIQUE PAR: DATE:

GVWR/PNBV KG (LB)

GAWR/PNBE	TIRES/PNEU	RIMS/JANTE	COLD INFL. PRESS./PRESS. DE GONFL. A FROID
FRONT/ AVANT KG (LB)			KPA SINGLE DUAL (PSI/LPC)
INTERM/ INTERM KG (LB)			KPA SINGLE DUAL (PSI/LPC)
REAR/ ARRIERE KG (LB)			KPA SINGLE DUAL (PSI/LPC)

THIS VEHICLE CONFORMS TO ALL APPLICABLE U.S. FEDERAL MOTOR VEHICLE SAFETY STANDARDS IN EFFECT ON THE DATE OF MANUFACTURE SHOWN ABOVE.

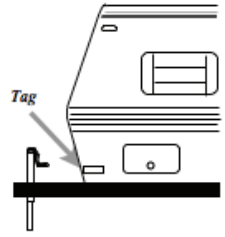
THIS VEHICLE CONFORMS TO ALL APPLICABLE STANDARDS PRESCRIBED UNDER THE CANADIAN MOTOR VEHICLE SAFETY REGULATIONS IN EFFECT ON THE DATE OF MANUFACTURE. - CE VEHICULE EST CONFORME A TOUTES LES NORMES QUI LUI SONT APPLICABLES EN VERTU DU REGLEMENT SUR LA SECURITE DES VEHICULES AUTOMOBILES DU CANADA EN VIGUEUR A LA DATE DE SA FABRICATION.

V.I.N./N.I.V.: TYPE/TYPE: FD-228

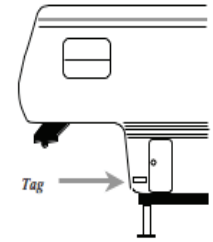
The weight of this fifth-wheel as manufactured at the factory. It includes all weight at the coach's axle(s) and tongue or pin. If applicable, it also includes full generator fluids, fuel, engine oil and coolants.

CCC (Cargo Carrying Capacity)

Is equal to GVWR minus each of the following: UVW, full fresh (potable)



Travel-Trailer



Fifth-Wheel

water weight (including water heater) and full LP gas weight.

GAWR (Gross Axle Weight Rating)

TRAILER WEIGHT INFORMATION

VIN OR SERIAL NUMBER

GVWR (GROSS VEHICLE WEIGHT RATING) IS THE MAXIMUM PERMISSIBLE WEIGHT OF THIS TRAILER WHEN FULLY LOADED. IT INCLUDES ALL WEIGHT AT THE TRAILER AXLE(S) AND TONGUE OR PIN.

UVW (UNLOADED VEHICLE WEIGHT) IS THE WEIGHT OF THIS TRAILER AS MANUFACTURED AT THE FACTORY. IT INCLUDES ALL WEIGHT AT THE TRAILER AXLE(S) AND TONGUE OR PIN. IF APPLICABLE, IT ALSO INCLUDES FULL GENERATOR FLUIDS, INCLUDING FUEL, ENGINE OIL AND COOLANTS.

CCC (CARGO CARRYING CAPACITY) IS EQUAL TO GVWR MINUS EACH OF THE FOLLOWING: UVW, FULL FRESH (POTABLE) WATER WEIGHT (INCLUDING WATER HEATER), FULL LP-GAS WEIGHT.

CARGO CARRYING CAPACITY (CCC) COMPUTATION	POUNDS	KILOGRAMS
GVWR		
MINUS UVW		
MINUS FRESH WATER WEIGHT OF GALLONS @ 8.3 LB/GAL		
MINUS LP-GAS WEIGHT OF GALLONS @ 4.5 LB/GAL		
= CCC FOR THIS TRAILER*		

*DEALER INSTALLED EQUIPMENT WILL REDUCE CCC

CONSULT OWNER MANUAL(S) FOR SPECIFIC WEIGHING INSTRUCTIONS AND TOWING GUIDELINES. CD-132

The maximum allowable weight that an axle system is designed to carry.

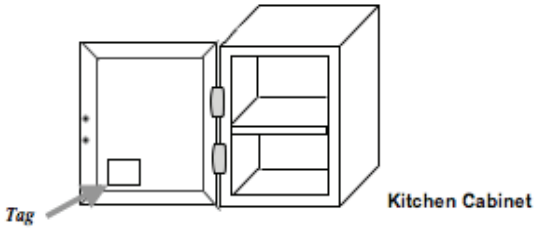
Weight Ratings - Labels

The information on the weight ratings is contained on two labels: The Federal Certification Tag and the RVIA Weight Label. Each label contains the Vehicle Identification Number (VIN) / Serial Number for the vehicle

⚠WARNING

Wheel Separation Can Occur! Exceeding the GVWR and GAWR ratings for your unit could result in serious damage to the suspension, frame or other components.

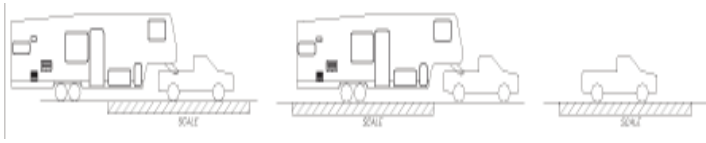
rated. These ratings are specific for each fifth-wheel and travel-trailer manufactured. Use only the ratings found on these labels:



Federal Certification Label

Location

The Federal Certification Tag on your fifth-wheel or travel-trailer can be located on the road side (off-door side) near the front of the unit as seen in the diagrams below. This tag contains the GVWR, GAWR (front and rear) and tire pressure limits.



RVIA Weight Label

Location

The RVIA Weight Label is located on the inside of an upper kitchen cabinet door. In general, the tag is affixed to the cabinet above or adjacent to the sink. This tag provides the GVWR rating, the UVW (Unloaded Vehicle Weight) and the computation for CCC (Cargo Carrying Capacity).

Weighing Your Unit

Fifth-Wheel

- Pull forward on the scales until only the coach's axles are on the scale. Record axle weight. Pull off the scales and unhook from the fifth-wheel. Weigh the truck by itself and record this weight.

- To determine hitch pin weight subtract the weight of the tow vehicle from the combined truck /coach weight. Write this number down.
- To determine overall weight, add the hitch weight plus axles

Travel-Trailer

- Drive the loaded trailer onto the scales as shown in the picture below, making sure that the hitch will be the only contact point with the scales after unhooking. Unhook and drive the tow vehicle off the scales. Level the trailer and record hitch weight.
- Hookup to the trailer and pull forward on the scales until only the trailer axles are on the scale. Level the trailer and record axle weight.
- To determine overall weight, add the hitch weight plus axles.

Hitches and Towing

Fifth-Wheel

1. Adjust the landing gear jacks until coach is at level for hooking to the tow vehicle.
2. Place wheel chocks behind fifth-wheel's tires.
3. Lower the tailgate on truck.
4. Release the fifth-wheel lock handle on the tow vehicle.
5. Line up the tow vehicle so the fifth-wheel will accept the kingpin.
6. Close and latch tailgate.
7. Back truck slowly until kingpin engages the fifth-wheel and automatically locks
8. Ensure the lock is closed.
9. Connect the power seven-way cord between the tow vehicle and the fifth-wheel.
10. Connect the emergency breakaway switch cable.
11. Test the fifth-wheel brakes and exterior lights
12. Completely raise the landing gear.
13. Store the wheel chocks.
14. Check the tire pressure while the vehicle tires are cold.
15. Re-torque the lug nuts. Refer to "Wheel Nut Torque"

Travel-Trailer

1. Crank the tongue of the trailer jack up until the hitch coupler is high enough to clear the tow vehicle.
2. Back the tow vehicle to the trailer until the hitch ball is directly under the coupler on the trailer.
3. Set the parking brakes, raise the locking latch on the coupler and crank it down on the ball.
4. Move the locking latch down to lock it on the ball.
5. Engage the lock and retainer clip.
6. Raise the tongue by cranking the jack down. (The tow vehicle will come up with it if the high coupler is properly latched.)
7. Connect the power cord between the tow vehicle and the trailer.
8. Connect the breakaway switch, assuring the breakaway cable is not attached to any part of the tow vehicle assembly.
9. Crank the jack all the way up.
10. Install and adjust side mirrors.
11. Check all lights on the trailer and tow vehicle.
12. Pull forward and check the operation of the trailer brakes with the hand control to assure proper operation. (Refer to manufacturer specifications on setting the brake control.)

Before Towing

- Ensure the TV antenna is down and in the correct position.
- Disconnect all park connections and are securely stored.
- Close and secure all doors, windows, awnings and roof vents
- Return the Entry step to the travel position.
- Refer to the “Pre-Travel Checklist” located in the Appendix

Towing

Towing a recreational vehicle can be enjoyable and worry-free if special attention toward safety is applied every time you hit the road and before heading out on our first camping trip, practice turning, stopping and backing in low traffic areas or large parking lots. In time, traveling with a recreational vehicle in tow will be as easy as driving the family car.

Controlling Sway or Fishtailing

Sway or fishtailing is the sideways action of a trailer caused by external forces. It is common for travel trailers to sway in response to strong winds or crosswinds or when passed by or passing a semi-tractor and trailer or driving downhill. Sway or fishtailing of your recreational vehicle can be controlled and is primarily impacted by four factors:

- Equipment
- Tongue weight
- Driving
- Corrective measures

Equipment - When hitched together, the trailer and the tow vehicle must be level. The tires of both the trailer and tow vehicle should be in good condition and inflated to the pressure recommended as noted on the exterior of the trailer and in the owner’s manual of the trailer and tow vehicle.

Your trailer brakes should work in synchronization with your tow vehicle brakes. Never use your tow vehicle or trailer brakes alone to stop the combined load. Your brake controller must be set up according to the manufacturer’s specifications to ensure proper synchronization between the tow vehicle and the trailer. Additionally, you may have to make small adjustments occasionally to accommodate changing loads and driving conditions.

Also, we recommend a friction sway damper or hitch with built-in sway control be provided for your unit. Please consult your dealer regarding this equipment, as the RV manufacturer does not provide sway control devices.

Tongue weight - The tongue weight should be between 10% to 15% of the total travel trailer weight. See page 18 of this manual regarding the proper weight distribution of your recreation vehicle.

Driving - This is the most important component. The tendency for the vehicle to sway increases with speed therefore, obey all speed limits and reduce during inclement weather or windy conditions.

Corrective measures - If sway occurs the following techniques should be used:

1. Slow down immediately, remove your foot from the accelerator. Avoid using the tow vehicle brakes unless there is a danger of collision. Reduce speed gradually whenever possible. If you can do so safely,

⚠ WARNING

Excessive sway or fishtailing of your travel trailer can lead to the rollover of the trailer or tow vehicle. Serious injury or death can occur. It is important that you read and understand the information in this section.

⚠ CAUTION

Check tires for proper inflation and wheel lug torque to meet manufacturer’s specifications.

use the brake hand controller (independent of the tow vehicle brakes) to gently and progressively apply the trailer brakes. This will help to keep the vehicles aligned. Practice using the brake hand controller on a deserted parking lot. Don't wait until an emergency occurs before using it.

Location of the brake hand controller is important and should be made easily accessible.

2. Steer as little as possible while maintaining control of the vehicle. Because of natural reaction lag time, quick steering movements to counter trailer sway will actually cause increased sway and loss of control. Keep both hands on the wheel. Hold the wheel as straight as possible until stability is regained.

3. Do not jam on the brakes or attempt to press on the accelerator to speed your way out of the fishtailing. Both actions make the situation worse and could cause severe injury or death.

4. Once the swaying is under control, stop as soon as possible. Check tire pressures, cargo weight distribution and look for any signs of mechanical failure. Travel at reduced speeds that permit full control until the problem can be identified and corrected.

Before Heading Out

Weight Distribution

Proper weight and load distribution is absolutely essential to safe towing. It is necessary to maintain a certain percentage of gross vehicle weight on the tow vehicle. Common recommendations place approximately 10% - 15% of a loaded weight on a travel-trailer hitch and approximately 20-25% on a fifth-wheel pin weight, as the weight comes out of the tow vehicle payload capacity. Too much or too little weight upon the hitch leads to dangerous driving conditions such as sway and reduced tow vehicle control. In no circumstance should the loaded weight ever exceed the GVWR or the GAWRs.

Safety Chains

Always use safety chains when towing. They maintain the connection between the travel-trailer and tow vehicle in the event of separation of the ball and trailer coupling. Safety chains are included with every travel-trailer and, in most states, are required when towing a travel-trailer. Hook them to the frame of the tow vehicle (not the hitch), crossing them under the trailers tongue. Inspect the length of the chains once attached to the tow vehicle frame. They should be long enough to allow for turns, but short enough to avoid any drag.

Breakaway Switch

The breakaway switch is another safety device as it provides a means of automatically slowing and stopping your RV if it should become detached during traveling. The cable from the breakaway switch should be attached to the tow vehicle so that it remains connected in the event the trailer coupling detaches from the hitch ball. The breakaway switch is powered from the RV 12 Volt battery. If separation occurs the pin is pulled out of the switch and current from the RV battery is applied to the trailer brakes.

⚠WARNING

Disconnect the unit from the Seven-Way Tow Vehicle Cord prior to testing the breakaway switch. Failure to do so may cause damage to the brake controller.

Tire Pressure

Maintaining proper tire pressure is another key to safety. The Cold Inflation Pressure for each axle is located on the Federal Certification Label. Cold inflation pressure refers to the pressure in the tire prior to traveling. Always check your tire pressure before traveling. Under inflated tires will cause excessive sidewall flexing and produce extreme heat, leading to early tire failure and possible loss of control. Over inflated tires can cause uneven tire where and also lead to early failure. More information on tires and maintenance can be found in the Care and Maintenance section.

Level Towing

Having the tow vehicle and recreational vehicle level with each other will help improve towability as well as safe driving. A hitch that is too low can cause the front to drag. A hitch that is too high can cause the rear to hit those high spots in the road.

Lights

Check all electrical connections to ensure all lights on the tow vehicle and travel-trailer are functioning properly. The break lights, hazards and turn signals should be in synchronization with the tow vehicle.

Mirrors

Adjust the mirrors on the tow vehicle prior to departure. Having someone to assist you will make this safety step quick and easy. First line up the tow vehicle and trailer. Next, sit in the driver's seat and adjust the left mirror to where you can see the entire left side of the trailer and well beyond. Finally, while still sitting in the driver's seat, have someone adjust the right mirror until the same result is achieved.

While Driving

Driving with a trailer in tow is different. Start out slowly, checking the traffic after signaling and being sure the road is clear. Accelerate slowly and evenly, checking the mirrors frequently as you move into the proper lane. Try to drive with an anticipation of problems that may occur way ahead and prepare for them, even though they may never happen.
As a motorist sharing the road, you are taller, heavier, longer and require more time and distance to stop. Weather and road conditions will require adjustments to speed. Anticipate dips, gutters, and depressions in the road, slowing down well in advance, these are the hardest jolts of any kind on your vehicle, hitch, recreational vehicle and items stored inside the unit. Take dips and bumps slowly and be certain the trailer wheels have passed the point before accelerating.

Backing

Back with care. Having a person outside to assist is a good idea. If no one is available to help, the driver should inspect the area behind the vehicle to avoid any unseen obstacles and unpleasant surprises.

Braking

Start sooner and lead with your trailer brakes. Prior to beginning any trip, make sure the brake control is adjusted. See your accompanying literature for the brake control you had purchased for your tow vehicle.

Due to slower speeds, cars can become trapped behind you on a two-lane road. It is courteous and practical to signal and pull onto the shoulder when possible allowing them to pass. This reduces passing hazards and saves tempers.

Passing and Accelerating

Remember when you pass another vehicle that it takes longer to accelerate and additional time must be allowed due to the added length of the trailer. Passing should be done on level terrain and downshift, if necessary for added acceleration. Whenever deciding to pass another vehicle, exercise caution and always use the turn signals.

Sharply Winding and Narrow Roads

Keep well to the center of the lane, equally away from both the center line and pavement edge. This allows the trailer to clear the edge of the pavement without the likelihood of the wheels dropping onto the shoulder, causing potential dangerous sway. Do not overcrowd or cross the center line.

All sharp turns should be taken at low speeds. Professional drivers, when rounding turns, slow down well in advance of the turn, entering it at reduced speed, and then accelerate smoothly as they come out again into the straightaway.

Steep or Long Grades

Down shifting into a lower gear or range in advance assists braking on descents and adds power on the climb. Avoid situations that require excessive and prolonged use of the brakes. Apply and release brakes at short intervals to give them a chance to cool.

Slippery Pavement

On slippery and icy pavement, reduce speed and drive slowly. Hydroplaning can occur with little water on the pavement. If skidding begins, remove your foot from the throttle and gently apply the trailer brakes only.

Freeways and Highways

Try to pick the lane in which you want to move and stay in it, preferably keeping to the slower lane on the right.

Turning Corners

Here is where you find a first basic difference when towing. The trailer wheels do not follow the path of your tow vehicle's wheels. The trailer will make a closer turn than the tow vehicle. Compensate by pulling further into the intersection so that the trailer will clear the curb or clear any parked vehicles along the road. Left turns require a wider than normal swing into the new lane of traffic to keep the trailer from edging into the opposing lane. Use the turn signals early to communicate to traffic behind and slow down well in advance.

Mud and Sand

Let the momentum of the tow vehicle and trailer carry you through. Apply power gently and stay in the tracks of the previous vehicle. If stuck, tow the trailer and tow vehicle out together without unhitching.

Parking

Whenever possible avoid parking on a grade with a recreational vehicle in tow. If it is necessary, turn the front wheels of your tow vehicle into the curb and set the parking brake. For added safety, place wheel chocks under the trailer wheels on the down roadside.

⚠ WARNING

Secure cargo and vehicles as far forward as possible. Excess weight in the rear of this trailer can result in loss of stability when towing.

Consult the trailer Owner's Manual for loading and weighing procedures. Keep the loaded tongue weight between 10% and 15% of total weight for travel trailers, and between 20% and 25% of total weight for 5th wheels.

Move cargo and/or vehicles to maintain proper balance. Do not exceed GVWR (total weight rating) or GAWRs (axle weight ratings) of the trailer or tow vehicle.

KRV102

Fifth-Wheel Leveling Procedures

1. Choose a site that is as level as possible (Some sites are equipped with a prepared surface such as concrete or asphalt). Ensure the ground is not soft and will support the weight of the fifth-wheel on the stabilizing jacks or other support devices.
2. Before uncoupling, level the fifth-wheel from side to side with suitable lengths of 2" x 6" wood blocks under the coach's wheels. Place the wood blocks on the ground forward of the wheels and tow the unit onto the blocks. Block the wheels to be sure the fifth-wheel cannot roll.
3. Lower the "quick drop" landing gear legs before extending the landing gear. The positioning of the "quick drop" legs will depend upon how level your campsite is from side to side and front to rear. The landing gear is then extended. It may be necessary to place a sturdy 2" x 6" wood block under the foot pads to support the landing gear on soft ground surfaces.
4. After stabilizing the unit, be sure the fifth-wheel frame is not twisted, buckled or stressed. Check that all doors and windows operate freely and do not bind.
5. Before resuming travel, be sure the stabilizer jacks are fully retracted.

Ramp Trailer Weight Distribution

All loaded trailers must remain within GVWR and GAWR limits. However, proper load distribution is of particular importance for ramp trailers. These trailers are designed to carry a variety of internal combustion engine vehicles in the transportation storage area. These cargo items are typically heavy and consideration must be given to how they are loaded. Because most storage areas are at the rear of the vehicle the biggest concern is maintaining the correct hitch or pin weight percentage. Vehicles loaded incorrectly can have too little weight resting on the hitch or pin and can become unstable when towing. Therefore, a hitch weight percentage of 10 – 15% for travel trailers and 20 – 25% for fifth wheels must be maintained. For example, if the loaded vehicle weighs 8000 pounds, the hitch weight for a travel trailer should be between 800 – 1200 pounds (10 – 15% of the 8000 pound total). For a fifth wheel this same 8000 pound vehicle should have a pin weight of 1600 – 2000 pounds (20 – 25%). By maintaining the correct hitch percentage and staying within the limits of the GVWR and GAWR you can insure a safe towing experience with your trailer.

Travel-Trailer Leveling Procedures

1. Chose a site that is level as possible (Some sites are equipped with a prepared surface such as concrete or asphalt.) Ensure

Note

Leveling
Put a small round bubble-level inside the refrigerator to determine proper level for refrigerator operation.

Slide-Outs
In extended use situations, it is advisable to add support blocks under the slide- room. Do not raise the room. Just touch the bottom.

⚠ WARNING

Secure cargo and vehicles as far forward as possible. Excess weight in the rear of trailers can result in loss of stability when towing.

Note

Stabilizing jacks are designed to level and stabilize your coach. Do not attempt to lift the unit to change a tire or for any other purpose.

WARNING

After-market stabilizer stands must be placed only under chassis frame rails. Stabilizer jacks should not be placed at extreme corners of the frame. Locating stabilizers in these locations can cause slide-room damage if leveling blocks were to shift or settle. Do not attempt to level, raise or otherwise place all of the weight of the unit on the stabilizer jacks. Do not use stabilizer jacks for tire-changing.

WARNING

Portable fuel-burning equipment, including wood and charcoal grills and stoves, must not be used inside the recreational vehicle. The use of this equipment inside the recreational vehicle may cause fires or asphyxiation.

WARNING

When refueling tow vehicle, shut off all Propane gas appliances. Most Propane gas appliances are vented to the outside. Gasoline fumes could enter the appliance and ignite from the burner flame, causing an explosion or fire.

WARNING

Propane Gas containers shall not be placed or stored inside the vehicle. Propane Gas containers are equipped with safety devices that relieve excess pressure by discharging gas to the atmosphere.

the ground is not soft and will support the weight of the trailer on the stabilizing jacks or other support devices.

2. Before uncoupling, level the trailer from side to side with suitable lengths of 2" x 6" wood blocks under the trailer wheels. Place the wood blocks on the ground forward of the wheels, and tow the trailer onto the blocks. Block the wheels to be sure the trailer cannot roll.

3. Put the foot pad on the hitch jack post, uncouple the trailer from the tow vehicle and level the trailer front to rear. It may be necessary to place a sturdy 2" x 6" wood block under the jack post foot pad to support the jack post on soft ground surfaces.

4. Check the level of the trailer with a carpenter's level both crosswise and lengthwise on the trailer floor.

5. After stabilizing the trailer, be sure the trailer frame is not twisted, buckled, or stressed. Check that all doors and windows operate freely and do not bind.

6. Before resuming travel, be sure all stabilizers are removed or fully retracted.

Scissor Jack

"T"- Type Jack

Telescopic Jack

Stabilizing Jacks

Dependent upon the type (travel-trailer / fifth-wheel), product and model purchased, the stabilizer jacks included will vary. Although stabilizer jacks come in different types and sizes, all perform the same function: To stabilize the front and rear of all recreational vehicles while parked for camping.

Always park the recreational vehicle on level ground and use tire chocks. It is extremely important to level the trailer front and rear using the tongue jack (travel-trailers) or landing gear (fifth-wheels). Using the crank for the particular stabilizer jack, lower the jack(s) on the lowest side of the trailer first and check the level. Adjust if necessary and then lower the other jack(s) to finish stabilizing the trailer.

Chapter 4: Appliances and Equipment

What to do if you smell gas

Do not try to light any appliance
Extinguish any open flames including cigarettes
Do Not Touch Any Electric Switch
Open windows and doors
Exit trailer
Shut off the gas supply at the gas container (bottle or source)
Immediately call a service center or gas supplier from an outside phone and follow their instructions
Do not turn on the gas supply until the gas leaks have been repaired

Refer to the individual manufacturer's owner's manual for operating instructions on the following equipment.

Air Conditioner (Optional)

Roof mounted air conditioners are operated by an 110V AC power source through a separate circuit breaker. Keep in mind that typically RV electrical systems are designed to handle 30 amps and that the air conditioner takes a sizable portion of that when the compressor starts. (Limited product models have an optional 50 Amp capability. (See Chapter 5, Electrical Systems) Reduce other loads as much as possible when using air conditioning to reduce the chance of overload and possibly tripping the main breaker. (For thermostat operation on the air conditioner, see "Thermostat" in this section)

Capability vs. Environment

The capability of the air conditioner to maintain the desired inside temperature is directly effected by the heat gain of the RV. During extreme high outdoor temperatures, the heat gain of the vehicle may be reduced by:

1. Parking in a shaded area
2. Keeping blinds down or drapes shut
3. Keeping windows and doors shut and minimize usage
4. Operation on High Fan/Cooling mode will provide the maximum efficiency in high humidity or high temperatures
5. Using awnings to block direct sunlight exposure on the unit
6. Avoiding use of heat producing appliances
7. Giving the A/C a "head start" by turning the air conditioner on early in the morning

Care and Maintenance

Periodically remove the return air filter and wash with hot soapy water. During extended use situations, cleaning is recommended after two weeks of daily usage.

Antenna (TV)

The television antenna installed is designed for either color or black-and-white television. If reception is poor, make sure the power supply switch is on and connections are tight. Should the reception remain poor, check with your authorized dealer.

To Raise Antenna

1. Check location to ensure no obstacles will be encountered while raising the antenna.
2. Turn elevating crank (clockwise) in an "UP" direction about 13 turns or until resistance is felt.
3. Turn Power Supply switch to "ON" (If cable is being used the power supply switch needs to be set to "OFF".)

⚠WARNING

DO not store or use gasoline or other flammable vapors and liquids in the vicinity of any appliance.

⚠CAUTION

Never run the A/C without the filter. This could plug the unit evaporator cell, substantially effecting performance.

⚠WARNING

CrossRoads RV is not responsible for damages to the TV which occur during or related to the transport of this unit. Other than removing the TV for transport, the supplied straps are the best way to minimize the potential for damage.

⚠WARNING

Do not raise TV antenna near overhead electrical wires as contact may cause injury or death.

CAUTION

If heavy rain or wind is predicted, or whenever you leave the awning unattended, it is best to close the awning. Damage to the awning or unit due to weather is not covered under the CrossRoads RV Company Limited Warranty or the awning manufacturer warranty.

WARNING

DO NOT attempt any repairs to the awning. The awning roller tube is under extreme spring tension. Repairs should only be performed by an authorized dealer / repair center.

CAUTION

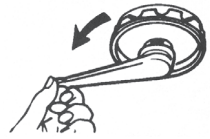
DO NOT USE the Slidetopper™ in snowing or freezing rain conditions as it may prevent the awning from retracting properly with the slide-room and cause damage to the awning and / or slide-room.

Rotate for Best Picture

1. Make sure antenna is fully raised.
2. Pull down on lower ceiling plate with both hands until it disengages and will turn.
3. Slowly rotate clockwise or counterclockwise for best picture and sound.

To Lower Antenna

1. Rotate antenna until pointer on directional handle aligns with pointer on ceiling plate.
2. Turn elevating crank (counterclockwise) in “DOWN” direction about 13 turns or until resistance is felt. Antenna is now locked in travel position.



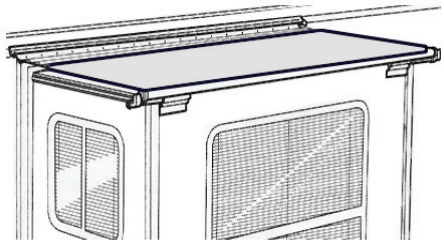
Awning, Patio (Optional)

A patio awning is a very popular accessory on recreational vehicles. They provide additional living area for your campsite as well as protection. CrossRoads RV Company uses several awning models. The appropriate instructions for the equipped awning are included in the unit packet. Please review the manufacturer instructions carefully prior to using the patio awning.

Care and Maintenance

The best way to extend the life of the awning is to keep it clean and operating smoothly. At the start of every camping season or after extensive traveling, inspect the top and bottom brackets and tighten if loose. Moving parts, such as the lift handle, rafter and support arms, may become hard to operate due to weather exposure and use. If this occurs, spray the part(s) with a silicone spray. To keep the awning operation smooth, repeat the process on a regular basis. Mold and mildew on the fabric can be avoided by periodically cleaning the vinyl with a mild non-abrasive cleaner and inspecting it for leaves or other debris before closing. After cleaning, allow the fabric to dry completely before rolling up. When raining, lower one end of the awning so that the water will run off and not pool on the fabric, and avoid rolling it up when wet. If necessary, unroll as soon as conditions permit to allow the awning to dry.

Awning, Slide-Out (Optional)



When installed the A&E Slidetopper™ awning will automatically open and close along with the slide-room. Fully extended the awning is level, which may cause water to puddle on top of the canopy. As the slide-room is closed, the awning will roll up and cause any puddles to spill over the sides of the awning. Before retracting the slide-room, check to make sure the Slide Topper is free of any debris (leaves, twigs, etc.), which can damage the awning or slide-room components.

WARNING

Before operating the slide-room, assure there are no objects (or people) in the path of the room or the Slidetopper™.

Cable Hook-Up

At many commercial campgrounds, cable access is provided. To utilize the cable access, locate the exterior hookup on the side of the recreational vehicle. Attach cable to access hook-up and trailer hook-up. Finally, make sure the antenna power booster is off.

Converter: See Electrical Section

Fan-Tastic Vent™ (Optional)

The Fan-Tastic Vent™ runs on 12V. Dependent upon the model, operational control may be by a thermostat like control switch or by controls directly mounted on the vent. (See the information included in the unit packet for operating instructions concerning the installed model.). When using the Fan-Tastic Vent™, close all vents and slightly open the windows on a shaded side of the coach. The direction of the airflow is determined by which window(s) are opened. Please note that the dome of the vent must be opened at least three inches for the motor to operate. A

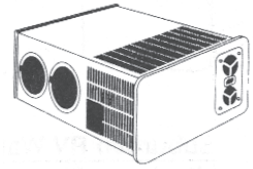
safety switch will prevent operation if the dome is closed or open less than three inches.

WARNING

Failure to read the furnace user's information manual and follow instructions could cause a fire or explosion, causing property damage, serious injuries or loss of life.

Furnace

The furnace installed is a Propane gas appliance. Carefully read the manufacturer's manual for complete operational and safety instructions, provided in the unit packet, prior to using the appliance.



The furnace utilizes a sealed combustion system, which means the combustion chamber is completely sealed from the inner atmosphere of your vehicle. Combustion air is drawn from the outside and combustion products are expelled outside through a vent.

New furnaces sometimes emit smoke and an odor during the first 5 - 10 minutes of initial use due to paint burning off the heating chamber. Do not mistake this for a malfunctioning furnace. Opening the windows and door prior to first lighting will help vent any smoke or odor.

Thermostat - Wall Mounted

CrossRoads travel-trailers and fifth-wheels have either a heat only thermostat or a combination air conditioner / furnace thermostat if an air conditioner is equipped at the factory. Please refer to the user's manual for the specific thermostat installed.

Operation - Heat Only Thermostat

To turn "ON": Set temperature to desired level.
To turn "OFF" set thermostat to lowest setting and follow instructions for furnace operation in the manufacturer's user's guide

Heat Operation - A/C and Heat Thermostat

Set the temperature select lever to the desired temperature level.
Set the system switch to "FURNACE".

Cooling Operation - A/C and Heat Thermostat

1. Set the temperature select lever to the desired temperature level.
2. Select the FAN speed.
3. "HI": Maximum cooling / dehumidification.
4. "LO": Maintaining temperature level / night use.
5. Select FAN AUTO/ ON switch.
6. "AUTO": Runs whenever cooling required and stops when not required.
7. "ON": Air conditioner fan runs continuously to circulate air.
8. Set the system switch to the "COOL" position.
9. When the SYSTEM switch is in the "OFF" or "FURNACE" and the "AUTO/ON"

10. Switch is in the “ON” position; the A/C fan will run continuously at the selected fan speed. This circulates air inside the RV.

Fireplace

Fireplaces run on standard 120V and have full electrical certification throughout North America. If you choose to activate the heat feature, the fireplace will provide up to 5,115 BTU’s. Flame brightness is adjustable and the choice is yours whether or not to use the heat feature. Built in safety features include: impact resistant safety glass, cool glass upon touch and a safety switch for overheating with user reset. Read all documentation included prior to using.

Generator (Optional)

Any service or maintenance recommended by the manufacturer should be performed at an authorized service center and in accordance with all generator manufacturer recommendations. Please thoroughly read the accompanying manual.

IMPORTANT: MAKE SURE TO READ AND UNDERSTAND THE GENERATOR OWNER’S MANUAL BEFORE OPERATING THE GENERATOR. Observe all operating instructions and warnings as well as all recommended maintenance schedules and procedures.

The onboard generator makes your RV fully self-contained. It allows you access to 120 volts when there is no shore power available, but keep in mind that carbon monoxide is deadly! NEVER sleep in the RV with the generator running! Before you start and use the generator inspect the exhaust system. Do not use it if the exhaust system is damaged. Test the carbon monoxide detector every time you use the RV. Know what the symptoms of carbon monoxide poisoning are:

- Dizziness
- Vomiting
- Nausea
- Muscular twitching
- Intense headache
- Throbbing in the temples
- Weakness and sleepiness
- Inability to think coherently

If you or anyone else experience any of these symptoms get to fresh air immediately. Shut the generator down and do not operate it until it has been inspected and repaired by a professional. If the symptoms persist seek medical attention.

1. DO NOT operate the generator while sleeping. You would not be aware of exhaust entering the recreation vehicle, or alert to symptoms of carbon monoxide poisoning.
2. Never store anything in generator compartment. Always keep compartment clean and dry.
3. DO NOT operate the generator in an enclosed building or in a partly enclosed area such as a garage.
4. Review the safety precautions for fuel and exhaust fumes elsewhere in this manual.
5. DO NOT operate the generator when the recreation vehicle is parked in high grass or brush. Heat from the exhaust could cause a fire in dry conditions.
6. Never operate your chassis or generator engine, or the engine of any vehicle, longer than necessary when the vehicle is parked.

⚠ DANGER

A generator produces carbon monoxide from its exhaust fumes from its engine during operation. Carbon monoxide can be fatal! When the device detects carbon monoxide in the air it will sound. Consult the individual detector’s user manual for specific instructions and / or audible warning meanings.

DANGER

Propane-powered appliances produce carbon monoxide. Carbon monoxide can be fatal! When the device detects carbon monoxide in the air it will sound. Consult the individual detector's user manual for specific instructions and / or audible warning meanings.

WARNING

Never use wire brushes or any metallic item for cleaning range ports or orifice, as wire brushes or metallic items may shed, leading to a fire or explosion.

WARNING

Never use the range or oven for extra comfort heating. Cooking appliances are not directly vented to the outside as are the furnace / air conditioning systems.

7. DO NOT simultaneously operate generator and a ventilator which could result in the entry of exhaust gas. When exhaust ventilators are used, we recommend that a window on the opposite side of the unit "upwind" of exhaust gases be opened to provide cross ventilation.
8. When parked, orient the vehicle so that the wind will carry the exhaust away from the vehicle. DO NOT open nearby windows, ventilators, or doors into the passenger compartment, particularly those which can be "down wind", even part of the time.
9. DO NOT operate the generator when parked in close proximity to vegetation, snow, buildings, vehicles, or any other object could deflect the exhaust under or into the vehicle.
10. DO NOT touch the generator when running, or immediately after shutting off. Heat from the generator can cause burns. Allow the generator to cool before attempting maintenance or service.

Microwave / Convection Oven (Optional)

Installed microwaves operate on 120V AC power only and are a popular for quick and convenient heating and cooking. Due to differing models used it is recommended that the Owner's Guide in the Unit Packet be read to for use on special features and operations.

Care and Maintenance

To clean exterior surface and the oven interior, use only mild, non-abrasive soaps or detergents applied with a soft sponge or cloth. Never operate the microwave when oven is empty.

Monitor Panel : See Plumbing Section.

Range Hood

The range hood operates on 12V power and should be used as a ventilating system when cooking. Operational switches for the fan and / or light are on the front panel of the range hood.

Care and Maintenance

Care of the range hood is similar to the range. Use warm soapy water and wipe off any grease before staining can occur. Do not use harsh chemical cleaners or abrasives. Clean the plastic light lens and filter by removing and washing in hot soapy water. Frequency of cleaning is dependent upon range usage.
The range or cook-top installed is a Propane gas appliance. Carefully read the manufacturer's manual for complete operational and safety instructions, provided in the unit packet, prior to using the appliance.

Range / Cook-Top

Operation – Top Burners (Range or Cook-top)

Prior to Lighting

Assure the gas supply to the trailer is turned "on".
Open a window and / or vent for ventilation purposes.
Check for any hazards (flammable liquids, fabrics, objects near burners).
If gas smell is present, Do Not Light. -See "What to do if you smell gas"

Depress knob corresponding to burner to be lit and turn to “Lite” position.

Immediately Light Burner

Match-Light Models: Hold a long match or a hand held igniter, near the burner port. Make sure the hand held igniter is the type designed for open flame burners.
Piezo Ignition Models: Rotate the Piezo knob clockwise rapidly. This will produce a spark to ignite the gas.

After lighting adjust burner flame to needed level.
If flame on burner goes out after initial lighting or during cooking, turn burner knob to off and wait 5 minutes before attempting to relight. Before attempting to relight check to make sure gas smell has disappeared. If odor still present after 5 minutes, DO NOT relight burners. See “What to do if you smell gas”.

To turn burner(s) off: turn the knob(s) to the “OFF” position.

The Range or Cook-top installed is a Propane gas appliance. Carefully read the manufacturer’s manual for complete operational and safety instructions, provided in the unit packet, prior to using the appliance.

Operation - Oven (if equipped)

Oven pilot must be lit prior to operating.

Lighting Oven Pilot

Be sure all valves and oven control knob are in the “OFF” position
Assure the main gas supply is on.

Open oven door and smell for gas. If odor present – Stop and:

- Do not try to light any appliance
- Extinguish any open flames including cigarettes
- Do Not Touch Any Electric Switch
- Open windows and doors
- Exit trailer
- Shut off the gas supply at the gas container (bottle or source)
- Immediately call a service center or gas supplier from an outside phone and follow their instructions
- Do not turn on the gas supply until the gas leaks have been repaired

If no gas smell present, light a match, depress and turn oven control knob to “Pilot On” and light pilot.

Operation of Oven Burner

Depress oven knob and turn to desired setting.
(A delay of appx. 45 seconds will occur before burner is lit- This is normal.)

To Shut Down Oven Burner

Turn oven control knob to “Pilot On” position – This will keep the oven pilot lit.

To Shut Down Oven Pilot

Turn oven control knob to “OFF” position.

DANGER

When refueling tow vehicle, shut off all Propane gas appliances. Most Propane gas appliances are vented to the outside. Gasoline fumes could enter the appliance and ignite from the burner flame, causing an explosion or fire.

Care and Maintenance

Before cleaning make sure all knobs are in the “OFF” position and wait until all surfaces, including burners, are cool. Use warm soapy water only. Do not use oven cleaners, bleach or rust removers on the range/cook-top surface. Wipe up any spills as soon as possible to avoid possible discoloration or pitting on the surface. Check burner ports when cleaning. If the ports or the orifice is clogged, carefully clean with a toothpick.

Follow the instructions and warnings noted in the appliance and equipment owner’s manual as well as the ones listed below:

- Annual maintenance should be conducted on the propane appliances and equipment by an authorized dealer or repair facility.
- Insects can build nests in the burners of the various appliances and equipment. The burner and burner orifice of the propane appliances and equipment should be cleaned out by an authorized dealer or repair facility anytime circumstances or conditions warrant, but no less frequently than on an annual basis.

Refrigerator

The refrigerator installed is a Propane gas appliance. Carefully read the manufacturer’s manual for complete operational and safety instructions, provided in the unit packet, prior to using the appliance.

Operation

The refrigerator operates on either 120V AC or Propane Gas and has a gravity-based cooling system. This system requires that the recreational vehicle be level for efficient operation. The cooling coils are sloped to allow continuous movement of the liquid chemicals and if the unit is not level for extended periods, the flow of these chemicals will slow and pool inside the tubing, resulting in a loss of cooling.

During towing, the leveling is not as crucial as the movement of the trailer will prevent the liquid inside the tubing from pooling. If needing to park for several hours, the trailer should be leveled if operating the refrigerator or the refrigerator needs to be turned off.

Placing a small bubble level inside of refrigerator will assist in determining if level for operational efficiency.

When starting the refrigerator for the first time or after extended storage, allow up to four hours for the cooling cycle to become fully operational.

Operational Controls

Auto Mode: The control system on the refrigerator will automatically select between gas and AC electric operation. AC will always be selected if available. If AC becomes unavailable, the refrigerator will switch to gas mode operation. When in auto mode the indicator lamp on the control panel will be lit.

Gas Mode: This mode when selected provides gas operation only. The indicator lamp for auto mode will not be lit.

Care and Maintenance

Exterior: Ventilation of the refrigerator is essential. Make sure the vents are clear of any obstructions such as bird/insect nests,

spider webs, or any other debris. Periodically clean the coils on the back of the refrigerator with a soft bristled brush. At no time should any combustible materials, such as gasoline, flammable liquids or vapors be stored near the refrigerator.

Interior: When cleaning the interior lining of the refrigerator, use a weak solution of soda and warm water. Use only warm water, however, when cleaning the finned evaporator, ice trays and shelves. Never use harsh chemicals or abrasive cleaners to clean these parts or their protective coatings will be damaged.

Defrosting: When defrosting the refrigerator, shut off the power by turning the main power button to the off position. Remove any food and leave the drip tray under the finned evaporator. Remove light bulb or cover switch with a piece of tape. Leave the door(s) open and empty drip pan when necessary. Dry with a soft cloth when done.

ANY SERVICE TO THE REFRIGERATOR, MUST BE PERFORMED BY A QUALIFIED REPAIR TECHNICIAN.

Roof Vents

Manual and / or power roof vents are installed on CrossRoads Recreational Vehicles. (For Fan-Tastic Vent, see the information on this specific product in this section.) Operate the roof vents when showering, bathing, washing dishes, or anytime hot water is used, as it allows moisture to escape. Ventilation is extremely important in reducing condensation formation.

Safety

Fire safety is important whether at home or in a recreational vehicle. The best way to limit fire risk is by prevention. Follow the manufacturers' instructions on the use of all appliances and observe all safety warnings and instructions included.

Before camping, make certain the locations of all safety equipment inside the coach and all emergency exit windows as well as doors. An escape plan for emergencies whether at home or camping is always a good idea.

Egress Windows

Egress or "Emergency Exit" Windows are labeled from the factory with the word EXIT. All Egress windows can be distinguished by red operational handles or levers. Dependent upon the window type, an egress window may be a large section or an entire window. Review the locations and operational instructions posted upon the window with all passengers.

Fire Extinguisher

Each recreational vehicle includes a fire extinguisher, which is located near the main entry door. The fire extinguishers are rated for Class B (gasoline, grease, and flammable liquids) and Class C (electrical) fires. Test and operate according to manufacturer instructions.

Propane Detector

See the Propane section of this manual.

DANGER

If the alarm sounds, provide ventilation by opening windows and doors. The CO build-up may dissipate before help arrives, but may be only temporarily solved. It is crucial that the source of the CO is determined and repaired.

DANGER

The CO alarm can only warn you in the presence of CO. It does not prevent CO from occurring nor can it solve an existing CO problem.

DANGER

Carbon monoxide can be fatal! When the device detects carbon monoxide in the air it will sound. Consult the individual detector's user manual for specific instructions and / or audible warning meanings.

Smoke Detector

For safety a smoke detector is installed in the living/ cooking area. Smoke detectors should be tested prior and during each camping trip, or weekly during the season. Most detectors are powered by a 9-Volt battery. Keeping fresh extra batteries on hand is a good idea.

Carbon Monoxide Detector

A carbon monoxide (CO) detector is installed in your coach. For specific information regarding the specific operation or functions of the particular detector in your unit, consult the individual manufacturer's owner's manual.

Common sources of CO are malfunctioning or misuse of gas appliances, vehicle engines, generators and many other fuel burning products.

Indications of CO poisoning are (but not limited to):

Mild Exposure

- Symptoms of the flu (minus a fever)
- Slight Headache
- Dizziness
- Fatigue

Medium Exposure

- Sever Throbbing Headache
- Drowsiness
- Confusion
- Fast Heart Rate

Extreme Exposure

- Unconsciousness
- Convulsions
- Cardiorespiratory Failure
- Death

For your safety and to keep your carbon monoxide alarm in good working order, follow the steps below.

- Verify the unit alarm, lights and battery operation by pushing the "Test" button weekly
- Vacuum the CO alarm cover with a soft brush attachment once a month to remove accumulated dust
- Instruct children never to play with the CO alarm. Warn children of the dangers of carbon monoxide poisoning
- Never use detergents or solvents to clean the carbon monoxide alarm
- Avoid spraying paint, hair spray, air fresheners or other aerosols near the CO detector
- Do Not paint the CO detector. Paint will seal the vents and interfere with the sensor ability to detect CO
- Do not place near a diaper pail
- Test the alarm operation after your coach has been in storage, before each trip and at least once a week during the camping season

Chapter 5: Electrical System

The electrical system in recreational vehicles is a combination 12 Volt DC (Direct Current) and 120 Volt AC (Alternating Current) system. Every facet of the electrical system is carefully engineered and installed to comply with the "American National Standard #A119.2" and the "National Electric Code." To understand this system, simply put, the 12 Volt system is what an automotive uses and the 120 Volt system is what most households use.

12 Volt System - DC

The 12 Volt system can be powered in three different ways: a separate RV battery, the converter changing 120V AC to 12V DC or by the tow vehicle's 12 Volt system. The water pump, certain lights, power vents, and other appliances are powered by the 12 Volt system.

The heart of the 12 Volt system is the battery. Batteries are essentially storage devices for electrical energy. Most batteries used in RVs are RV / Marine Deep Cycle, Lead-Acid types. These batteries contain lead plates and liquid sulfuric acid electrolytes in sections called cells.

Electrolytes are lost whenever a battery discharges energy or is recharged. The level of the electrolyte must stay above the plate in each cell. Many premature battery failures occur because the electrolyte level was not maintained. For maintenance and storage information see the Care and Maintenance Section.

110 Volt System (Also referred to as 120) - AC

The 120 Volt system is supplied by plugging the power cord (shore cord) into an outside source. It furnishes current to the 120 Volt appliances and fixtures like the roof air conditioners, the refrigerator, lighting and all 110V receptacles. It also supplies power for the 12 Volt trailer system through the converter.

The AC circuits are protected by circuit breakers and can handle from 15 to 30 Amps depending upon the circuit. The most common cause of a circuit breaker to open is an overloaded circuit. An example of an overloaded circuit is when a space heater is plugged into the same outlet as the toaster. If this happens, reduce the load on the circuit and reset the breaker.

Power Cord / Shore Cord

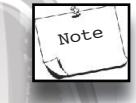
The power cord, often referred to as shore cord or shoreline, is a heavy-duty cable with a 3 or 4 prong grounding plug on one end and connects directly to the power converter inside the unit on the other end. This cord is used to plug into an external 120V source. Most cords are typically 30 Amp plugs (3 prong), although certain components or ordered options on some units will require a 50 Amp (4 prong-plug).

Do not plug shore cord in while under load. Make sure all appliances are turned off prior to connecting shore cord.

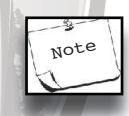
30 Amp, 50 Amp and Available Power

30 Amp Capability

30 Amp service is 120 Volt service limited to a total draw of 30 Amp. The power cord from the RV is three pronged. 30 Amp service is the most common in the RV industry and used widely in campgrounds through the United States. With 30 Amp service any appliance in the RV can operate



Before plugging in the RV shore cord, turn off all electrical appliances so as not to start under a" load", which could cause a breaker to open. Reverse this process before unplugging.



The power cord prongs should always be clean and solid. Clean with a contact cleaner, emery cloth and or a nail file. Electrical connections work better when clean.

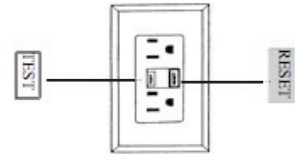
by itself. However, due to the 30 Amp limitations, you may not be able to run a certain group or all appliances at the same time. For instance, most air conditioners will draw up to 16 Amps on start up and about 11 Amps when running continuously. While running the microwave and pulling 15 Amps, you decide to turn on the air conditioner, the initial draw of up to 16 Amps may overload the circuit, causing a breaker to trip. Below a reference chart has been supplied to show typical amperage draw on common appliances and fixtures.

APPLIANCE	AMPERAGE CONSUMED
Roof Air Conditioner (Continuous)	11.4
Roof Air Conditioner (Initial Start)	Up to 16
Electric Water Heater	12
Microwave	13
Converter	8
Refrigerator	3.5
TV or VCR	1
Hair Dryer	2
110 Volt Light	1

50 Amp Capability (Optional)

30 Amp service has a three-prong cord while 50 Amp utilizes a four-prong. With the 30 Amp plug, only one prong carries the l20V power. With the 50 Amp plug, two of the four plugs carry 120 Volt allowing for the ability to set up power needs according to appliance application. As such, if your unit has 50 Amp service two air conditioners can run at the same time if they are routed on different feeds, while running other appliances commonly used within an RV. If your unit has below 50 Amp service, alternate appliance use according to the chart above to prevent popping breakers.

Available Power



Despite the power system built into a recreational vehicle, the power system is only as good as the power supply. If the campground has only 30 amp service available, an RV with 50 amp service will only be able to use 30 amps of service. Some campgrounds have only 15 amp service available which is not adequate to properly run an air conditioner or certain other appliances. See chart above. The best way to know what amperage is available is to call ahead to the campground. There are special adaptors available through your local CrossRoads dealer to make these connections to campgrounds with lower service ratings.

WARNING

Never replace circuit breakers or fuses of higher current rating than those originally installed. This could overheat the wiring and start a fire.

Adapters

These devices connect to the end of a 50 amp shore cord to allow it to plug into a 30 amp outlet or the end of a 30 amp shore cord to allow it to plug into a 15 amp outlet. When using adapters, your available electrical power for the entire unit is reduced to the rating of the adapter. For Example, if using a 30 to 15 amp adapter, the entire unit only has 15 amps available for power. This is not adequate to properly run an Air Conditioner or certain other appliances. See chart on page 33.

Extension Cords

It may be necessary to use an extension cord to extend your recreational vehicle shore cord to the available campground electrical outlet. It is critical; the correct size cord is utilized ie. 30 amp service- 30 amp extension cord.

If using an extension cord rated less than the RV's shore cord, it reduces the available electrical power for the entire unit to the rating of the extension cord. The length of the extension cord can also affect the available power. Do not use ANY adapters with an extension cord and do not plug multiple extension cords together at one time. Your local CrossRoads dealer can assist you in obtaining the proper extension cord for your needs.

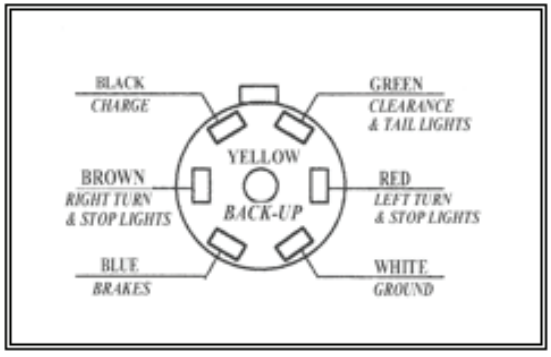
Converter

The main purpose of the converter in your RV is to provide 12 Volt power to the unit while plugged into an AC outlet, such as at a campground. The converter will, as its name indicates, convert the incoming alternating current to direct current, so as to operate the appliances and fixtures requiring 12 Volt DC power. In essence, utilization of the converter will reduce the usage of the RV battery.

The converter installed helps by trickle charging the RV battery when the trailer is plugged into AC power. When connected to the tow vehicle the RV battery will also be charged. When using AC power and having the RV battery hooked up, check the electrolyte level more often if staying connected to AC for a lengthy period of time.

If remaining plugged into AC power for extended periods, check the electrolyte level often in the RV battery.

GFCI – (Ground Fault Circuit Interrupter)



Bathroom and exterior receptacles are protected by a highly sensitive device, known as a "Ground Fault Circuit Interrupter", which is designed to sense the slightest electrical "short" at those receptacles and instantly disconnect the current before a person can be injured.

WARNING

Exceeding the amperage rating of an adapter can cause low voltage which may cause damage to the appliances or other components. It may also cause the adapter or the shore cord to melt leading to fire which could cause property damage, personal injury or death!

WARNING

Exceeding the amperage rating of an extension cord can cause low voltage which may damage appliances or other components. It may also cause the extension cord to melt leading to fire which could cause property damage, personal injury or death!

Testing

The GFCI receptacle should be tested at least once a month or prior to every trip. To test the GFCI, push the TEST button. The RESET button will pop out. Power is now off at all outlets protected by the GFCI receptacle. Push in the RESET button in to restore power. The test is complete when the reset button remains pushed in. If the RESET button does not pop out when testing, the GFCI is malfunctioning and no outlets should be used on this circuit, as protection is lost. Call your dealer if the GFCI malfunctions.

Maintenance

This item requires no maintenance other than periodic testing as described above. If for any reason, this switch malfunctions, do not attempt to repair yourself. Contact an authorized repair facility.

7-Way Plug

A 7-pin plug supplies the electrical connection between the tow vehicle and the recreational vehicle. This plug connects into a receptacle on the tow unit to allow operation of the recreational vehicle's marker lights, taillights, brake lights and electric brakes. A charge line from the tow unit's alternator is also run to this receptacle, which allows charging to the RV battery.

No.	Color	Item	Wire Gauge*
1	White	Common Ground	8
2	Blue	Electric Brake	12
3	Green	Tail Lights and License	14
4	Black	Battery Charge	8
5	Red	Left Stop and Turn	14
6	Brown	Right Stop and Turn	14
7	Yellow	Center Auxiliary	14

Care and Maintenance

Maintaining the Plug requires little effort. Store safely when not in use and clean the prongs as needed. Please see your dealer if repair work is necessary.

Typically, the wires within the 7-Way Plug are color-coded as identified in the graphics on this page.

Brakes, Electric

Included in the unit packet is an extensive manual by the manufacturer of the brakes, axles, hubs and drums. Please refer to this manual for information of any of these systems.

Breakaway Switch

The breakaway switch is designed to work in the event separation occurs between the tow vehicle and the RV while on the road. As separation occurs, the pin is pulled from the switch. A circuit from the trailer battery to the RV brakes becomes closed, and activation of the trailer brakes results.

Care and Maintenance

Do not let the lanyard, which is connected to the pin drag upon the ground. Inspect the condition of the lanyard prior to travel. As well, since the breakaway safety feature operates on the trailer battery, insure the battery is fully charged and the terminals are clean. Testing the switch prior to traveling is recommended (See below). If a problem is noted, or if the switch fails during testing, please call your dealer.

How to Test the Breakaway Switch

1. Disconnect the power cord from the RV to the tow vehicle
2. Pull the lanyard pin out to the first stage
3. Brakes should audibly engage
4. Double check by moving the tow vehicle forward slightly to be sure the RV brakes have locked and are operating correctly

WARNING

The breakaway switch is for emergency use only.

Chapter 6: Propane Gas System

Read all manufacturer appliance literature, including the information on the Propane bottles and regulator, provided within the unit packet and follow any instructions given.

General Information

Propane gas (also called LPG, Liquefied Petroleum) when properly handled, is a clean burning dependable fuel for operating all Propane gas appliances. The Propane gas system involves the tank(s) (Also called bottles or cylinders), regulators, valves, supply lines and appliances. Propane tanks contain liquid under high pressure, which vaporizes into a gas and passes through the regulator to automatically reduce the pressure. Low-pressure gas is then distributed through the supply lines to provide the fuel for Propane appliances.

Consumption of Propane gas depends upon the frequency and duration of use of the Propane appliances. The furnace and oven have the highest consumption rates. During cold weather it is advisable to check the bottles often and always keep one full. Safety must be observed at all times when using the Propane gas system. Propane gas is colorless and odorless in its natural state. An odorant, similar to rotten egg smell, has been added for consumer safety purposes to help detect leaks and provide warning.

Propane gas is highly flammable and is contained under high pressure. Improper use may cause fires and / or explosions. If a sulfur or “rotten egg smell” is detected in or around the trailer, perform the following steps immediately:

What to do if you smell gas

Do not try to light any appliance
Extinguish any open flames including cigarettes

WARNING

Propane-powered appliances produce carbon monoxide. Carbon monoxide can be fatal! When the device detects carbon monoxide in the air it will sound. Consult the individual detector’s user manual for specific instructions and / or audible warning meanings.

DANGER

DO NOT attempt to adjust or repair regulator. Adjustments and repairs require specialized training and tools. Contact a qualified Propane Service Technician. Failure to follow these instructions could result in a fire, explosion and / or injuries, including loss of life.

Do Not Touch Any Electric Switch
Open windows and doors
Exit trailer
Shut off the gas supply at the gas container (bottle or source)
Immediately call a service center or gas supplier from an outside phone and follow their instructions
Do not turn on the gas supply until the gas leaks have been repaired

Propane Regulator

The regulator is the heart of the Propane system. Propane gas is under high pressure in the bottle and the regulator reduces this pressure to allow safe use with the appliances in recreational vehicles.

The lower pressure is distributed to the appliances. The arrow on the automatic gas regulator will always point to the gas bottle in service. When the red flag appears in the inspection glass, this indicates that bottle is empty. In systems without automatic changeover, the arrow should be then turned toward the other bottle and the empty filled as soon as possible.

Care and Maintenance

The regulator has a vent that allows it to breath. If pressure builds too high within the regulator, it vents until pressure reaches a normal range. Check the vent frequently to keep the vent clean and clear of any debris, corrosion or obstruction. A clogged regulator can result in higher pressures, loss of fuel and / or component failure. The vent can be cleaned by using a toothbrush and should be checked periodically by a qualified Propane service center.

Bottle Systems – (Primarily on Fifth-Wheels)

CrossRoads uses Propane cylinders equipped with a safety valve to prevent over-filling the tank. Rapid changes in pressure during filling or when switching the regulator changeover valve can cause this safety feature to activate, causing a “no gas flow” situation. The problem occurs when the system downstream of the cylinder valve and above the regulator has less pressure than the bottle pressure. The check valve activates, sensing a break in the line. In order for the valve to reset, the pressure in the line must equalize with the tank pressure. Internal mechanisms allow for a very small bypass flow to achieve equalization. This usually takes 2-5 minutes. Filling instructions for the split bottle system are on the following page.

Filling Propane Gas Bottles

CrossRoads Propane systems are equipped with a Type I cylinder connection, making them as easy to connect and disconnect as a garden hose.

The Type I connection system uses the Excess Flow Pigtail Hose, distinguished by the large green nylon swivel nut. The green swivel nut attaches to the outside of the cylinder valve with right hand threads. Tighten the swivel nut by hand. DO NOT use tools.

The safety features of this system prevent gas from flowing unless the connection is tight and will limit excessive gas flow. In cases of extreme

heat, 240° to 300°F, at the connection, the connection to the cylinder will be shut down.

Procedure For Filling Propane Cylinders Equipped With An OPD Valve

1. Shut off tow vehicle and extinguish all appliance pilot lights when filling tanks
2. Ensure that the hand wheel valve is in the closed position
3. Attach the fill hose to the outlet on the valve
4. Turn on the Propane source
5. Open the bleeder valve on the Propane tank 10 percent
6. Slowly open the cylinder bottle hand wheel valve approximately one-quarter turn
7. As the cylinder starts to fill, the hand wheel valve may be opened more. One turn is all that is necessary to complete filling the tank.
8. When the bleeder valve begins to spit liquid, shut off the Propane fill source, close the bleed screw on the cylinder, then close the valve.

Propane Gas Lines

The primary manifold is a black pipe located beneath the unit. Copper tubing, with flare fittings, is used as secondary lines running to the gas appliances. If repairs are needed to these lines or any component of the Propane system, DO NOT ATTEMPT to repair yourself and follow the above instructions.
Although your Propane gas system was thoroughly inspected for leaks before delivery, gas fittings can loosen from vibration during travel. The Propane gas system should be inspected at least once a year

Propane Gas Leak Detector

Read the operating instructions, located in the unit packet thoroughly for the specific model installed in the unit.

The Propane gas leak detector is a safety device that is permanently mounted near the floor and is powered by 12V (the RV battery and / or converter). The detector is operational only as long as sufficient battery power is available. If the power is disconnected, the monitor will not operate.

Should a propane leak occur, the detector will sound an alarm and continue until the gas has dissipated or until a mute button is pressed. The mute button will only stop the alarm from sounding for 60 seconds and will reoccur if gas is still present. Sometimes in new coaches, an alarm will sound due to the odor in a new trailer from glues and other materials used to build the unit. The alarm also may sound at times when no Propane is present due to household product use such as aerosol hair spray, cleaners, adhesives, alcohol etc. Be sure to air out the trailer thoroughly after delivery and when using these products.

The Propane gas leak detector has a self check circuit which runs at all times while receiving 12 Volt power. In the event that the circuitry fails, a failure alarm will sound and the operating indicator will cease to light.

⚠ WARNING

Propane gas may be present in other areas before it can reach the detector's location. The detector only indicates the presence of Propane gas at the sensor. Never check for leaks with open flame. Use only a mild soap and water solution.

When To Test Detector

Testing of the detector is recommended every week, if power is interrupted or before each camping trip. The Propane detector must be operating for at least 60 seconds before it can be tested.

When the Alarm Sounds...

Open all doors and major windows.
Turn off the gas supply at the Propane tank.
Do Not re-enter until alarm stops sounding.
Turn on gas supply.
If alarm sounds a second time, turn the gas off and contact an authorized dealer or Propane service technician.

Chapter 7: Plumbing System

A recreational vehicle plumbing system consists of two sub-systems: The fresh water system and the wastewater system.

Portable fresh water is supplied by either the fresh water tank aboard the unit or from an outside source connected through the city water connection. When using the fresh water tank, the water is pumped through the water lines by means of the water pump. When utilizing an exterior source, such as a campsite water supply, the pump is not needed as the water is already pressurized and will flow through the water supply lines within the trailer.

Water Pump

The 12 Volt water pump installed is self-priming and totally automatic, operating upon demand. When a fixture is opened the pump draws water from the tank and pressurizes the lines, providing water to the open fixture. The pump has an on/off switch and is located on the monitor panel. DO NOT turn on the pump if the fresh water tank is empty.

CAUTION

Never let the water pump run while the fresh water tank is empty. Damage to the pump and / or a blown circuit may occur.

Before Turning On The Pump Switch

1. Check the water level in the fresh water tank – if empty, refill. (See *"Fresh Water Tank Fill"*)
2. Open kitchen and bathroom faucets, hot and cold valves, and any shower/tub fixtures.
3. Check to make sure Water Heater By-Pass Valve is set to "Normal Flow" to allow water into the hot water heater.
4. Turn on switch for water pump and allow the pump to fill the water lines and hot water heater tank.
5. Close each faucet after it delivers a steady stream of water.
6. The water pump should stop running after all faucets are closed.
7. Pump should now run on "demand" when a faucet is opened, and stop when the faucet is closed.

Fresh Water Tank

A fresh water tank is equipped on all travel-trailers and fifth-wheels. Tanks vary in size according to product and model. To determine how much fresh water the system can hold, refer to the RVIA TRAILER WEIGHT INFORMATION label located on the inside of the kitchen cabinet door near the sink.

The full capacity rating of fresh water for the travel-trailer / fifth-wheel includes the cumulative total of the tank, lines and the hot water heater tank.

Fresh Water Fill

To fill the fresh water tank, remove the cap, on the exterior connection labeled "Fresh Water Connection", and insert a garden hose. Check the monitor panel to determine the level of water in the tank during filling. When full, water may spill out back through the valve, as there is no automatic cutoff. When filling the fresh water tank it is a good idea to also fill the hot water heater and lines to provide the maximum system capability.

When traveling with the water tank full, the cargo carrying capacity is reduced.
Water should be drained from the fresh water system when not in use for more than one week.

City Water Fill

The city water fill allows a direct connection to an outside source, such as campsites with water risers. There is no need to use the water pump as the water coming from the exterior source is already pressurized and will bypass the pump and tank. Connect the city water fill by using a hose manufactured for potable water use. Open faucets and allow any air to be purged.

City water fills are marked with a label and may be installed as a separate piece of equipment or as a part of a combination water inlet housing.

Sanitizing the Fresh Water System

Keeping the fresh water system clean and free of any potential contaminations is a top priority. Sanitizing the system before initial use and thereafter annually, or whenever water remains unused for prolonged durations, is recommended. This will help keep the water system fresh and discourage harmful bacterial or viral growth. To sanitize your system, perform the following:

1. Drain the tank by opening the low point drain for the fresh water tank.
2. Prepare a chlorine bleach solution of ¼ cup to one gallon of water for every 15 gallons of tank capacity.
   Example: Use 2 ¾ gallons of the solution for a 40-gallon tank. If using Ultra bleach concentrations, reduce bleach to 1/8 cup to one gallon of water.
3. Add solution to tank and fill with water. Open each faucet/ fixture until a distinct chlorine odor is smelled. Close faucets and let stand 4 hours.
4. Drain system and flush with fresh water until chlorine odor and smell is gone. (If a water filter has been added, change it at this time).

About Vibration While Traveling

Although the fresh water system was thoroughly inspected for leaks before delivery, fittings can loosen over time, from vibration during travel. Periodically check the fittings at the faucets and visible connections and tighten when necessary.

Water Heater

The Water Heater installed is a Propane gas appliance. Carefully read the manufacturer's manual for complete operational and safety instructions, provided in the unit packet, prior to using the appliance.

The water heater installed is typically a 6-gallon, (standard), 10-gallon or 16-gallon (optional on some units).

Dependent upon the model installed, the water heater will operate only on gas or on upon either gas or AC current. For specific water heater operating instructions, please consult the user's manual located in the unit packet. Prior to operating the water heater, be sure there is water in the fresh water tank and in the water heater.

Care and Maintenance

Proper maintenance of the water heater relies on inspection and awareness. *(Full maintenance requirements are listed within the manufacturer's user's manual located in the unit packet.)*
An anode rod within the tank increases the life of the tank and under normal use will deteriorate. Replacement of the anode rod should be done yearly or more frequently if water supplies contain high levels of iron or sulfate. Another important maintenance procedure is periodically checking the water heater screen in the exterior door for any obstructions, such as animal /insect nests or debris. Proper ventilation is essential to the safe operation of the water heater.

A qualified technician should do any repairs that need to be performed. If soot is present anywhere, immediately shut the unit down and contact a qualified service technician. Soot is a sign of incomplete combustion and must be corrected before operating the water heater.

Pressure Relief Valve - Weeping or Dripping

As in residential water heaters, the water heater equipped in recreational vehicles contain a pressure relief valve that is designed to open if the temperature of the water within reaches 210 degrees F or if excessive pressure is built up. When pressure reaches 150 pounds, the relief valve will open and water will drip from the valve. The valve will close automatically once the pressure falls below 150 pounds. This dripping is normal and does not indicate a malfunctioning or defective valve.

Also, as water is heated it expands and with the closed water system in a recreational vehicle, water expansion will cause weeping at the pressure relief valve. One way to minimize this weeping is by maintaining an air pocket at the top of the water heater tank. The air pocket forms naturally by design but will reduce overtime through normal use.

Replenishing the Air Pocket

1. Turn off water heater.
2. Turn off cold water supply.
3. Open a faucet in the RV.
4. Allow time for water to cool and Pull out handle of the Pressure Relief Valve and allow water to flow from the valve until it stops.
5. Release handle on valve-it should snap shut.
6. Close faucet and turn on cold water supply, as tank fills, the air pocket will be replenished.

Water Supply and Odor

Water supplies sometimes contain high levels of sulphur, which causes an unpleasant smell, similar to rotten eggs. While unpleasant, the water is not harmful. Sanitizing the water system, as described earlier and allowing the sanitizing solution to remain for a few days, should eliminate the odor. Remember to thoroughly flush the system after sanitization. Adding a filtration system will help reduce such occurrences.

Draining and Storage

When not using for long periods or storing during the winter months, the water heater must be drained to avoid damage from freezing during the winter and / or deterioration of tank life from mineral content in water supplies.

To Drain the Water Heater

1. Turn off power to the water heater at the switch or the main breaker.
2. Shut off the gas supply and the water pump.
3. Open all fixtures, both hot and cold throughout the unit.
4. Place the bypass valve (if equipped) in the “by-pass” position.
5. Remove/open the exterior access door to the water heater.
6. Remove the anode rod from the tank. Water will drain out tank.

By-Pass Kit (Optional)

The by-pass kit is a popular convenience feature that allows for easier drainage of the hot water heater tank and winterization of the unit. The by-pass kit is installed near the cold water inlet of the water heater and allows for blockage of water flow into the water heater, saving time and reducing the amount of anti-freeze needed during winterization.

Monitor Panel

The monitor panel allows you to check the approximate liquid levels in the fresh water and the gray and black holding tanks. Dependent upon the type of monitor panel, 3 or 4 tanks can be monitored along with the charge condition of the battery. (The water heater switch is located on some models.)

Operation

Depress the button for the desired reading (tank or battery.) The levels readout for the tanks will read at Empty (E), 1/3, 2/3, or Full (F). All lights will be lit when full. The battery conditions are as follows:

C Charge
G Good
F Fair
L Low

Erroneous Readings

The monitor panel displays readings from sensors attached to the tanks. These sensors can send false readings when the following conditions occur:

1. Water with low mineral content. Minerals in water help conduct the electrical signal to the monitor display. Some water, which is very low in mineral content, may not conduct the signal

properly. Although infrequent, this condition can exist. Check the panel reading when the fresh water tank is filled.

2. Material trapped on the sides of the holding tanks also may provide full readings when the tank is actually empty. Use of a spray to wash out the tank following dumping should help prevent this condition.
3. Grease build up on the sensor probes may indicate false readings or no readings at all. Avoid pouring any grease, oils or similar substances down drains or the toilet. If this occurs, wash the tank(s) out with soapy water.

Winterization

RV components can be damaged from the effects of freezing. Protection of the plumbing system and related components is crucial. Damages due to weather are not covered under warranty at any time. Many recreational vehicle owners choose to have their units winterized by their dealer, while others choose to do it themselves. Following are descriptions of two methods used to winterize:

For Winterization Procedures, See the section "Winterization" in this chapter.

1. Compressed Air (Dry) Method

   Uses compressed air to blow out any remaining water in the system after draining the system of all water. This method requires an air compressor and appropriate adapters.

2 A. RV Anti-Freeze (Wet) Method without ez winterizing system

2 B. RV Anti-Freeze (Wet) Method with ez winterizing system

   Uses RV approved, nontoxic, potable, anti-freeze in the system and does not require any special tools.

Many CrossRoads products include an optional by-pass kit that allows the plumbing system to bypass the hot water heater, reducing the amount of anti-freeze that will be needed (by-pass kits are available at most RV service centers for a reasonable expense and can be installed during winterization). Without a by-pass kit installed, an additional 6 – 10 gallons of anti-freeze will be required.

On the following page are the procedures for both methods. Your local dealer is best suited to answering any questions as well as providing information on winterization and storage that may be particular to the climate in your area.

If using the compressed air method, a special adapter should be purchased to allow compressed air to be delivered through the city water fill. These adapters are available at most RV supply stores.

Method 1

Compressed Air
(With By-Pass Kit Installed)

1. Purchase 1-2 gallons of RV non-toxic anti-freeze.
2. Drain the fresh water tank and empty the waste water holding tanks.
3. Turn water heater by-pass valve to by-pass position. (The by pass valve is located near the water heater incoming lines – an access panel may have to be removed depending upon the model.)

4. Drain water heater.
5. If installed, remove water filter from assembly and discard. Install diverter if included.
6. Open all faucets, including shower head sprayer, toilet flushing device and any other water lines that are closed.
7. Turn on the water pump for 30 seconds to clear out any water in the lines.
8. Connect an air hose with an adapter to the city water fill connection.
9. Set the pressure no greater than 30 pounds and blow out the water lines until no water can be seen coming out of the fixtures and lines.
10. Pour RV anti-freeze into drains, p-traps, toilet, and tanks.

Method 2 A

RV Anti-Freeze without ez winterizing system
(With By-Pass Kit Installed)

1. Purchase 4 -6 gallons of RV approved, non-toxic, anti-freeze.
2. Drain all tanks, fresh water and sewage tanks.
3. Turn water heater by-pass valve to by-pass position. (The by pass valve is located near the water heater incoming lines – an access panel may have to be removed depending upon the model.)
4. Drain water heater.
5. If installed, remove water filter from assembly and discard. Install diverter if included.
6. Pour an amount of RV non-toxic anti-freeze into the fresh water tank to fill the tank above minimum water pump operating level. (Use of a long funnel may be helpful) Add more, if necessary, during procedure.
7. Turn on pump switch and open the cold water side of all faucet fixtures. Leave open until the anti-freeze comes out (generally, pink in color). Repeat for hot water side.
8. Flush toilet until anti-freeze begins to flow into the bowl and then pour one gallon of anti-freeze down the toilet to winterize the black tank.
9. Pour anti-freeze down each shower/tub, lavatory sink, and kitchen sink to fill p-traps.
10. To winterize gray tank(s) pour one gallon down each related sink drain.

Method 2 B

RV Anti-Freeze with ez winterizing system
(With By-Pass Kit Installed)

1. Purchase 4 -6 gallons of RV approved, non-toxic, anti-freeze.
2. Drain all tanks, fresh water and sewage tanks.
3. Turn water heater by-pass valve to by-pass position. (The by pass valve is located near the water heater incoming lines – an access panel may have to be removed depending upon the model.)
4. Drain water heater.
5. If installed, remove water filter from assembly and discard. Install diverter if included.
6. Locate the ez winterizing system found near water pump or on some models in water management panel. Turn valve to close flow from fresh tank and allow flow from ez winterizing hose. Place hose into supply of anti-freeze.

DANGER

DO NOT USE Automotive Anti-Freeze. Automotive Anti-Freeze is poisonous and not for use in potable water systems.

7. Turn on pump switch and open the cold water side of all faucet fixtures. Leave open until the anti-freeze comes out (generally, pink in color). Repeat for hot water side.
8. Flush toilet until anti-freeze begins to flow into the bowl and then pour one gallon of anti-freeze down the toilet to winterize the black tank.
9. Pour anti-freeze down each shower/tub, lavatory sink, and kitchen sink to fill p-traps.
10. To winterize gray tank(s) pour one gallon down each related sink drain.

De-winterization / Removal of Anti-freeze

If purchasing a coach which is winterized with RV anti-freeze, or having had an existing unit winterized before winter storage, the plumbing system must be flushed and sanitized prior to use. Do Not Attempt to turn on water heater if system is winterized. Perform the following prior to attempting to operate the water heater or use the plumbing system.

1. Drain all tanks, fresh water and sewage*
2. Attach garden hose to fresh water fill and fill tank.
3. Turn on pump switch and open cold water side of all faucet/ shower fixtures. Leave open until water runs clear. Repeat for hot water side.
4. Flush toilet until clear water runs into bowl.
5. Dump tanks again.
6. Sanitize water system.
7. If a water filter is installed, drain lines, remove filter assembly, clean and reinstall with new filter.
8. When ready to use the water heater, turn by-pass valve to open position to allow water to enter hot water heater tank and fill according to instructions

Waste Water System

The wastewater system inside the recreational vehicle is self-contained, while on the road or set up in a campsite. The main parts of the waste system are the toilet, holding tanks and tank dump valves. As in residential households, the drainage system also includes p-traps and roof vents to allow escape of odors and gases.

Toilet

The toilet operates from water supplied either by the fresh water tank or from an exterior water supply connected at the city water hook-up. (The water pump must be turned on when utilizing the water from the fresh water tank.) The toilet flushes directly into the black water tank. Complete instructions and care for the model installed are located in the unit packet.

Solid Build-Up

The most common problem associated with the waste system is solid build up. Using plenty of water when flushing the toilet, and keeping the tank valves closed until ready to flush the system can reduce the risk of build up. Should you ever have a build up of solids, close the valves, fill the tanks about ¾ full with fresh water, drive a distance to agitate the solids and drain the tanks.

Wastewater tanks must be dumped at state approved locations.

Do not put these items in toilet or drains

1. Facial tissues, paper towels, sanitary products (including those labeled flushable).
2. Detergents or bleach. Use a sewage tank deodorizer, available from dealer.
3. Automotive antifreeze, ammonia, alcohols, or acetones.
4. Grease from cooking, table scraps or other solids that may cause clogging.

Holding Tanks

Waste water is divided into two categories*: Black water* and *gray water*. The term black water refers to the waste flushed down the toilet and stored in a separate tank*, referred to as the *black tank*. Gray water is the wastewater from the sinks, tub and shower drains and is stored within one (or more) *gray tank*(s). Waste tanks empty through a single or 2 single depending on f.p. outlet, but a separate valve controls each tank.

The dump valves should remain closed even if connected to an exterior sewer hook up. For proper dumping, empty tanks only when they are nearly full. The idea is to send a large volume of water through the tanks and hose at the same time to assist the solid waste in flushing from the system.

Dumping Instructions

1. Twist off the termination outlet cap.
2. Connect the sewer hose by turning counterclockwise, locking the end levers over the termination end.
3. Place the other end of the sewer hose into an approved dump station inlet.
4. Open the black tank termination valve and drain.
5. Open the gray tank termination valve and drain. (If unit has 2 gray tanks, drain one at a time.) *
6. Close termination valves.
7. Disconnect sewer hose and store.
8. Replace termination cap on the outlet.
9. Add chemical deodorant / breakdown agent approved for RV use.

**If unit is equipped with the No-Fuss Flush System, perform flush at this time.*

After the sewage tank has been emptied, close the gate valves and put approximately five gallons of water in the sewage holding tanks. This will help prevent solids from building up. The addition of a deodorizing agent like Aqua-Kem® will help prevent odors.

No Fuss Flush (Optional)

If equipped, the no fuss flush kit has been installed to rinse the interior of the black tank. Similar to the water fills located on the exterior of the unit, a separate hookup is placed on the exterior.
Flush the tank after dumping by connecting the sewer hose and attaching a garden hose* to the inlet labeled *"Sewer Valve Must be Open When Using This Inlet*" OR "*Black Tank Flush*." Open the water supply to full pressure to flush tank. When water runs clear from sewer hose, shut off water supply and disconnect garden hose from source. Do not disconnect hose from flush inlet until water has drained from system.

For best results, use only biodegradable toilet tissue specifically manufactured for RV use, available from your dealer.

WARNING

DO NOT leave any hose connected when not in use.

WARNING

DO NOT add any check valves to this system.

WARNING

Before operating the slide-room, assure there are no objects (or people) in the path of the room or the Slidetopper™.

WARNING

Do not use the slide-out without being extended by design.

Note

During extended travel stays, move the room in and out once or twice a week to help keep the seals and internal moving parts lubricated.

During long-term storage periods, it is advised to have the room retracted.

Chapter 8 : Slide-Out Systems

Redwood uses basically three types of slide-room systems depending on the product application. For specifics concerning your type of system, please refer to the unit packet information.

Hydraulically Operated Systems

WARNING
FAILURE TO ACT IN ACCORDANCE WITH THE FOLLOWING MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

The *Lippert Hydraulic Slideout System* is intended for the sole purpose of extending and retracting the slideout room. Its function should not be used for any other purpose or reason than to actuate the slideout room. To use the system for any reason other than what it is designed for may result in damage to the coach and/or serious injury or even death.

Before actuating the system, please keep these things in mind:

1. Parking locations should be clear of obstructions that may cause damage when the slideout room is actuated.

2. Be sure all persons are clear of the coach prior to the slideout room actuation.

3. Keep hands and other body parts away from slideout mechanisms during actuation. Severe injury or death may result.

4. To optimize slideout actuations, park coach on solid and level ground.

Description

The *Lippert Hydraulic Slideout System* is a rack & pinion guide system, utilizing a hydraulic actuator to move the room assembly. The power unit drives the cyliner rod in a forward motion to drive the slideout room in and out. The *Lippert Hydraulic Slideout System* is designed to operate as a negative ground system.

Prior to Operation

Prior to operating the *LIppert Hydraulic Slideout System,* follow these guidelines:

1. Coach should be parked on the most level surface available.
2. Leveling or stabilizing system should be actuated to ensure coach will not move during operation of Bed Lift System.
3. Be sure battery is fully charged.
4. Be sure to keep all persons and pets clear of Bed Lift System during operation.

System Maintenance

The *Lippert Hydraulic Slideout System* has been static tested to over 4,000 continuous cycles with out any noticeable wear to rotating or sliding parts. it is recommended that when operating in harsh environments (road salt, ice build up, etc.) the moving parts be kept clean and can be washed with mild soap and water. No grease or lubrication is necessary and in

some situations may be detrimental to the environment and long term dependability of the system.

Electrical System Maintenance

For optimum performance, the slideout system requires full battery current and voltage. The battery must be maintained at full capacity. Other than good battery maintenance, check the terminals and other connections at the battery, the control switch, and the electric actuator motor for corrosion, and loose or damaged terminals. Check motor leads under the trailer chassis. Since these connections are subject to damage from road debris, be sure they are in good condition.

Mechanical Maintenance

Although the system is designed to be almost maintenance free, actuate the room once or twice a month to keep the seals and internal moving parts lubricated.

Check for any visible signs of external damage after and before movement of the travel trailer.

***Additional information can be found in the manual for this slideout system or at www.lci1.com.**

Electrically Operated Systems

The Lippert Electric Slide-out System uses a 12 Volt DC motor to power the rack and pinion style slide system room(s). Electricity for the motor assembly is supplied by the coach battery. Normal operation is performed by pressing the wall mounted slide-out switch to extend or retract the room.

Care and Maintenance

When operating the Lippert Electric Slide-out System™ it is recommended that the moving parts be kept clean, especially when operating in harsh climates or environments. Road salt, ice, sand, and salt water climates are examples of such conditions. The moving parts can be washed with a mild soap and water solution. Slide-out care does not require any grease or lubrication. Use of any grease or lubrication may affect the long term dependability of the system.

Electrical Maintenance

Electrical maintenance is also essential to the smooth operation of the slide-out system. Full battery current and voltage is essential for optimum performance. Regularly check the terminals of the battery, the control switch and the pump motor. Look for signs of any corrosion or loose or damaged terminals and connections from environmental conditions, as well as, road debris and vibration.

Manual Crank Option

The Lippert Electric Slide-Out System™ comes with a manual override system. This option can be utilized in case of power interruption or system failure. Detailed instructions on using this option can be found in the manual for this slide-out system.

Chapter 9: Care and Maintenance

The instructions and recommendations located within this manual and the accompanying manufacturer's component literature should be read, as failure to perform necessary or preventative maintenance may limit or void all or part of a specific warranty.

Care and maintenance of the recreational vehicle is an important step in maintaining the safety, dependability and the appearance, both interior and exterior, of the unit. Keep good records of all maintenance performed as these may be necessary for warranty information or may assist in possible repairs needed.

Operational usage and climates may affect the frequency of maintenance needed on certain components. Preventative maintenance is important to the life and enjoyment of any recreational vehicle as many problems can be caught before they occur. Please do not hesitate to call your dealer with a question on the maintenance or care of any item.

The care and maintenance of appliances are discussed within the appliance chapter. Always refer to the manufacturers recommendations located within the literature contained within the unit packet.

Exterior

Fiberglass / Gel Coat Finish

Care of the Filon™ finish is similar to caring for a new car. Any finish will deteriorate over time. Exposure to extreme sunlight, pollutants, and excessive moisture can cause dulling, fading and yellowing. Regular washing and periodic waxing will help maintain the glossy new look. When washing, use a mild, automotive or RV wash solution, available at your dealer, being sure to rinse off any loose debris first. Avoid spraying water directly into the furnace and refrigerator vents. Waxing the Filon™ areas twice a year is recommended. Wax with an automotive wax or polish developed for boats. Follow all directions by the wax manufacturer carefully and remember to wash and wax out of direct sunlight and when surfaces are cool.

Metal

The aluminum exterior has a baked on enamel finish. Washing frequently with an automotive or RV wash solution will help avoid staining from debris and soil build up. Always rinse unit with clear water prior to washing to remove any loose dirt. Waxing two to three times a year with a good automotive paste wax will help preserve the finish

DO'S and DON'TS

- Do Use Automotive / Marine grade non-abrasive waxes.
- Do Use Soft cloths to clean and wax
- Do be careful around graphics. Wax and wash with the graphic, not against it.
- DO NOT USE products containing ammonia or caustic harsh cleaners as they may cause discoloration to the fiberglass surface.
- Do Not use high-pressure washers, rotating brushes, such as in car washes, and power buffers. Use of these products can damage graphics and/ or paint finishes.
- Do not dry wipe surfaces
- Do not use rubbing compounds

ABS Plastic / Molded Parts

Some components of CrossRoads products are constructed of strong ABS molded plastic. A mild solution of soap and water should be used when cleaning. When using any product, make sure the product is recommended for use on plastics. Avoid harsh abrasive cleaners, ammonia or citric-based products as discoloration may result.

Carefully read the component manufacturer's manual for complete instructions and any applicable safety instructions, provided in the unit packet, prior to performing any maintenance.

Roof

The roofing system is a polymer membrane that will not rust or corrode and is quieter than metal roof systems. The rubber roof material itself does not require annual coatings or additional sealants. Wrinkles may develop in the material due to expansion and contraction from heating and cooling but this does not affect the integrity of the roof and is not a cause for concern.

The roof material can, however, be cut by sharp objects. Use caution when walking on or loading articles on the roof. Care is needed when driving or parking to avoid punctures. If damage does occur, the roof may be patched with a special kit available through your dealer. If accessories or new equipment is added, be sure the installer is qualified to work on the rubber roof material.

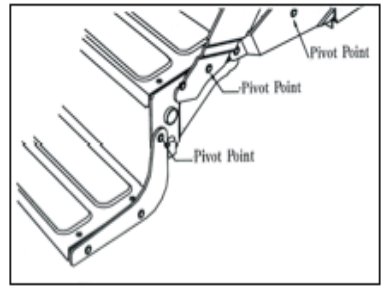
WARNING

The rubber roofing material, when wet, may be slippery. Always use caution when working on top of the RV.

Maintenance

Inspect the roof at least every 90 days, paying particular attention to the seams where the areas of sheet metal, moldings, rubber and/or fiberglass are joined. Carefully inspect the sealant around any vents, skylights, air conditioners, etc.

Exposure to the elements will cause sealants to deteriorate over time. Variations in climate and weather may accelerate deterioration. Inspection and periodic resealing is essential as preventative maintenance. If cracks or shrinkage is noticed, immediately follow the rubber roof manufacturer's recommendations for repair or resealing. Special sealants are used due to the composition of the roofing material. For the appropriate sealant, please see your dealer.



Cleaning

Prior to cleaning the roof, rinse the roof off to remove any debris. Be sure to keep the sidewalls wet to reduce streaking. Standard household detergents can be used for normal cleaning. Do not use petroleum solvents, harsh abrasives or citric-based cleaners that can damage the membrane. Appropriate cleaners such as Dicor Roof Cleaner™ are available through your dealer. Remember to rinse thoroughly after cleaning.

For stubborn stains, a cloth dampened with mineral spirits is suggested. Do not, however, pour mineral spirits directly onto the roof material or allow a stain to “soak”. Keeping the roof free of debris and clean will help prevent staining. Avoid parking in areas where fruit or tree sap may fall and remain directly on the roof for extended periods, causing irremovable stains.

Seals and Adhesives

The seals and adhesives used perform an important job, keeping out an RV enemy – water. Close inspection and routine maintenance are crucial to the longevity of the trailer. While many types are used, none have a pre-set lifetime, as exposure to the elements and regional variances of climate can accelerate any sealants deterioration. Therefore, every six months, inspection of all seals is recommended and a quick inspection prior to every trip will help reduce potential problems down the road.

When inspecting, check for cracks, voids, shrinkage, or any sign of deterioration. If any of these signs are noticed, have your dealer inspect and replace the sealant if necessary. It is important to use the same kind of sealant that was previously used.

Glass breakage is not covered under our limited warranty.

Windows (Exterior)

As with seals, check the sealant around the windows at least once every six months. If any interior leaks are noticed, contact an authorized dealer immediately. To ensure window operation, adjust and lubricate latches and any moving parts annually. A light oil or powdered graphite can be used for lubrication. Periodically use a vacuum attachment to clean any debris out of the window weep holes, which are necessary to drain any condensation or moisture from hard driving rains that may collect.

Rust is not covered under our limited warranty.

Frame and Chassis

Frame and Bumper

Over time, weather and climate such as rain, snow, salt, etc lead to corrosion. Rinse the undercarriage, wheel wells, hitch and bumper when needed to remove dirt, oil, tar, salt and other debris. Periodically inspect for rust. Near coastal regions, inspect more frequently. If needed, lightly sand and repaint with a rustproof enamel.

Steps

Clean regularly to remove dirt, salt, mud, etc. and lubricate pivot points with a quality automotive grade lubricant every 30 – 60 days.

Seal any nicks or scratches with primer and then cover area with a quality high-gloss paint to prevent rusting. If rust is noticed, sand the area lightly and then cover with primer. Follow with high gloss paint.

Hitch Couplers

Inspect prior to each trip. The ball socket and clamp should be cleaned and lubricated monthly with wheel bearing grease. If coupler or coupler components appear damaged or worn, contact your dealer upon notice of the problem.

Fifth-Wheel Coupler

Inspect monthly or prior to each trip. The hitch plate and locking mechanism should be generously lubed with a high temperature rated grease at all times. Consult the paper work that accompanied the hitch purchase for manufacturer recommendations.

Safety Chains

Safety chains should be inspected monthly. If chains are damaged or weakened, replace immediately. Never tow without use of the safety chains.

Carefully read the component manufacturer's manual and any safety instructions, provided in the unit packet, prior to performing any maintenance

Jacks

- Tongue Jacks, Manual (travel-trailers)

Whenever preparing to travel, inspect the jack for any damage and test operation. If jack is difficult to operate, clean and oil lightly. If jack is still difficult to operate or freezes, call your dealer. Service on any jack should be performed by qualified service personnel only.

- Tongue Jacks, Power (travel-trailers)

Prior to traveling, inspect the jack for any damage and test operation. Check connections at battery and keep contacts clean and secure. If the power jack malfunctions at any time, call a local dealer. Service on all power jacks should be performed by trained service personnel.

- Fifth-Wheel Jacks

Prior to each use inspect drop tube and inner ram tube. Replace or repair as required per component manufacturer instructions. Follow all preventative maintenance instructions provided on the specific component installed. If malfunction occurs, immediately call your local dealer. Service on any jack should be performed by qualified service personnel only.

Carefully read the component manufacturer's manual and any safety instructions, provided in the unit packet, prior to performing any maintenance

Tires and Wheels

The tires should be checked before starting out on any trip (See chart on following page). Check them regularly and keep inflated to recommended pressures. The recommended tire pressure is on the side of the tire. A tire gauge is a very inexpensive and valuable tool for checking tire inflation. Rotate the tires at lest once every 5,000 miles. You may want to have a spare tire with you in case of an emergency.

All travel-trailers and fifth-wheels are equipped with tubeless tires. They are designed for today's turnpike speeds are rated to carry the weight of the trailer plus your family's personal needs for an extended vacation. If you should require an adjustment on a fault or defective tire, secure the

If equalizer (weight distribution) bars are attached to vehicle while attempting to operate a power tongue jack, the motor may clutch and/ or seize upon attempting to bear the load. Damage to the jack under these circumstances will not be covered by CrossRoads RV Company or the jack manufacturer.

DANGER

Some procedures require the use of special tools for safe and correct maintenance. Do not attempt to service, repair or work on any axle, brake, or wheel system unless you have appropriate skills and knowledge. Lack of proper training, failure to follow procedures or use special tools and safety equipment could result in property damage, serious injury or loss of life.

name of the nearest tire dealer or distributor and request an adjustment according to the conditions and terms of the tire warranty.

Tire Changing Basics

1. Use emergency flares when near a road or highway.
2. Block the wheels on the opposite side from the tire you wish to change to prevent accidental movement.
3. Position a hydraulic jack on the frame close to the spring hanger. (Never attempt to use a stabilizer jack to lift the unit)
4. Raise the trailer until the tire clears the ground.

Tire Inspection

The chart below is a useful guide for use during inspections. When replacing tires consult the wheel and tire manufacturers' specifications for compatibility.

Wheel Nut Torque

The information contained in these printed instructions outlines the most recently recommended processes involving Lug Nut Torque and takes precedent over any information regarding Lug Nut Torque shown in your CrossRoads, Lippert or AL-KO Owners' Manuals.

The axle and wheel assemblies of your RV are designed differently than those on your car. The overall size, weight and center of gravity of a recreational vehicle subject the wheels to pressures unique to trailering. During normal cornering, the tires and wheels experience a considerable amount of stress called "side-load". Therefore, the lug nuts on your recreational vehicle require periodic retorqueing.

These instructions will show you how to maintain proper lug nut torque by following these important steps:

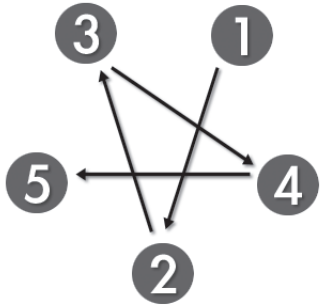
1. Check torque before every trip
2. Use proper tools
3. Follow the appropriate ANSI TSIC-1 Recommended Practice (at right)
4. Torque lug nuts in the correct stages and follow-up intervals after any wheel reinstallation.

For further information on these steps, you may want to refer to the axle manufacturer's owner's manual that accompanied your unit.

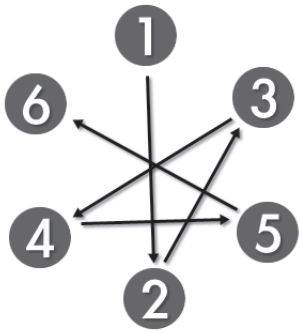
STEP 1 Wheel Reinstallation	STEP 2 Follow-up
1 20-30 ft/lbs 50-60 ft/lbs	3 110-120 ft/lbs 140-150 ft/lbs
2 55-60 ft/lbs 90-100 ft/lbs	
3 110-120 ft/lbs 140-150 ft/lbs	

Re-torque after first:
10 miles → 25 miles → 50 miles

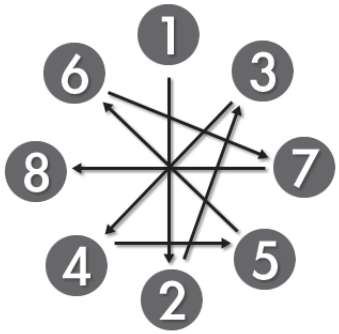
Remember, torque is the amount of rotating force applied to a fastener, such as a lug nut. Proper torque of lug nuts can only be achieved by using a torque wrench and a socket.



5 Hole Star Pattern



6 Hole Star Pattern



8 Hole Star Pattern

- Dial indicator or
  Adjustable dial torque wrench
- 7/8" or 13/16" socket

Using Torque Wrenches:

- Most torque wrenches are required to be set at "0" when not in use to maintain calibration.
- Please refer to the manufacturer's instructions for further information on use and maintenance.

Setting Torque Value on a Dial Indicator Wrench:

1. Make sure your indicator needle is set to "0".
2. As you apply clockwise pressure to the lug nut, both needles will show the current amount of torque being applied.
3. When you reach your desired torque value, stop applying pressure and your indicator needle will stay at the highest torque value reached.

Setting Torque Value of Adjustable Dial Wrench:

1. Unlock the handle and set the dial to your desired torque value.
2. Lock the handle back in place.
3. As you apply clockwise pressure to the lug nut, you will hear and audible "click" when the desired torque wrench value is reached. Do not apply further pressure once you hear the click".

Always remember:

- Check lug nut torque before every trip. CrossRoads RV recommends this maintenance procedure to ensure proper torque has been applied to lug nuts before heading out on the road.
- Lug nuts should be torqued to 110-120 ft/lbs on all units.
- Always follow the appropriate star pattern as indicated on the previous page or in your axle manufacturer's owner's manual to assure proper torque.

Pre-Trip Procedure:

1. Set your torque wrench to 110-120 ft/lbs.
2. Begin with the appropriate bolt for your wheel (12 o'clock position for 8 and 6 hole wheels and 2 o'clock position for 5 hole wheels, as illustrated) and apply torque to all lug nuts following the star pattern indicated.
3. Complete the procedure on each wheel. Before moving to each new wheel, be sure to verify your preset torque wrench value.

After removing a wheel from your RV for any reason, you must carefully follow a 2 step process:

1) Wheel Reinstallation
2) Follow-up

Step 1) Wheel Reinstallation

- During wheel reinstallation, the lug nut torque must be applied in 3 stages. This will ensure the wheel studs are centered in the wheel holes, and will help the lug nuts maintain proper torque.

1. Start all lug nuts by hand.
2. Stage 1: Set your torque wrench to 20-30 ft/lbs.
3. Begin with the appropriate bolt for your wheel (12 o'clock position for 8 and 6 hole wheels and 2 o'clock position for 5 hole

Some wheel assemblies require an extension. DO NOT USE a flexible extension. Also, DO NOT USE a 4-way socket or any other type of wrench (Figure E), which does not measure the actual pressure applied to the lug nut.

I f uncertain or unfamiliar with any procedure, please call your local dealer.

WARNING

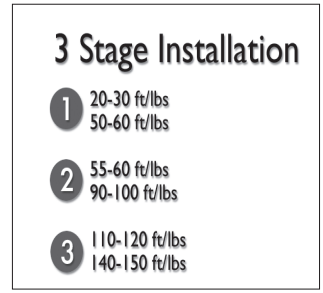
WHEEL SEPARATION CAN OCCUR
On the first trip, check for the proper torque every 10, 25 and 50 miles traveled in your coach. This procedure should also be repeated every time a wheel is replaced.

WARNING

Always torque wheel nuts to the wheel manufacturer's specifications. Over or under-torqued wheel nuts can cause the wheel to separate from the wheel mounting surface during operation, causing property damage, personal injury or loss of life.

wheels, as illustrated) and apply torque to all lug nuts following the star pattern indicated on the previous page.

4. Stage 2: Increase your torque wrench setting to 55-60 ft/lbs.
5. Begin with the appropriate bolt for your wheel and apply torque to all lug nuts following the star pattern indicated in Figure H.
6. Following stage 2, the wheel can support the weight of the trailer and can be lowered off of the jack stands.
7. Stage 3: Increase your torque wrench setting to 110-120 ft/lbs.
8. Begin with the appropriate bolt for your wheel (as illustrated) and apply torque to all lug nuts following the star pattern indicated on the previous page.



WARNING

Do not tow the trailer with missing lug nuts or faulty lug bolts.

WARNING

It is critical that the wheels be properly torqued every 50 miles during the first 200 miles of road operation. Although the wheels have been properly torqued before leaving the manufacturing plant, settling and wearing in of components during the first few miles of operation may cause some loosening of the wheel nuts.

DANGER

Installation of wheels which are not compatible with the manufacturer installed axle assembly could result in wheel separation, which can lead to property damage, serious injuries or loss of life.

Step 2) Follow-Up: Retorque after 10, 25, and 50 miles:

1. After the first 10 miles of your trip, pull your recreation vehicle off the road into a safe work area.
2. Set your torque wrench to 110-120 ft/lbs.
3. Begin with the appropriate bolt for your wheel and apply torque to all lug nuts following the star pattern indicated in Figure H.
4. Reapply torque and repeat steps 1, 2, & 3 again at 25 miles and at 50 miles of your first trip.
5. The follow up process is complete and you should refer to the general lug nut torque maintenance process described in section C “Pre-Trip Maintenance”.

Summary

1. Check torque before every trip
2. Use proper tools
3. Follow the appropriate star pattern sequence
4. Torque lug nuts in the correct stages and follow-up intervals after any wheel reinstallation

Wheel Bearing Lubrication

Wheel bearings should be repacked every 6000 miles or every 6 months. Every time the wheel hub is removed, the wheel bearings must be adjusted. Turn the hub slowly to seat the bearings while tightening the spindle nut until the hub will no longer turn. Loosen the spindle nut so it may be turned by hand. Tighten nut finger tight then loosen to first hub slot allowing alignment. Install cotter pin.

The spindle nut and hub should be free to move with the cotter pin being the only restraint.

Prepare bearings by cleaning with solvent to remove the old grease. Repack by pressing fresh bearing grease into bearing roller area. Repack bearings more often if subject to extremely wet conditions. If trailer ha not been used for more than 2 months, the wheel bearings should be inspected and repacked if necessary.

Repack bearings using a high temperature, automotive type wheel bearing grease produced by a reputable manufacturer. The soap type should be

polyurea, lithium complex or equivalent. Use a NLGI Grade 2 product with a minimum dropping point of 440F.

Super Lube

If the Recreational Vehicle is equipped with Super Lube, there is no need to lift the RV prior to greasing axles. To grease follow these simple steps:

1. Remove the rubber plug from the grease cap
2. Insert grease gun on the grease zerk
3. Pump until new grease begins to appear
4. Replace rubber plug

Hubs and components still need to be inspected and maintained per the manufacturer's guidelines.

Carefully read the component manufacturer's manual and any safety instructions, provided in the unit packet, prior to performing any maintenance.

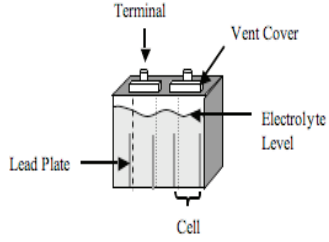
Brake Adjustment

The electric brakes are of the drum and two-shoe type and adjust the same as most automotive brakes. Adjust brakes after the first 200 miles. Every 3 months or 3000 miles, test the brake drag and adjust if required. Full procedures are outlined in the component manufacturer's guide, included in the unit packet. Never adjust just one brake. When adjusting brakes on any vehicle, either replace or adjust all brakes at the same time, or at least both brakes on the same axle.

Battery

Before performing any maintenance on the battery, always disconnect the To inspect the electrolyte level, remove the vent covers and visually ascertain the electrolyte level in each cell, using a small flashlight may help. (If a maintenance free battery has been purchased – no way exists to check these levels.) If the level needs to be replenished in any or all cells, carefully pour in distilled water only. Never use acid or tap water. Tap water contains minerals and chemical impurities that will permanently damage the battery.

Besides maintaining the electrolyte level, visually inspect the battery for loose terminals, corrosion, or any damage to the vent covers or case. Tighten any loose clamps on the terminals of the battery and clean any corrosion off the terminals. An inexpensive device for cleaning these terminals can be purchased at automotive stores.



When working with batteries, be extremely careful. The acid in batteries is highly corrosive and flammable. Batteries produce a flammable hydrogen gas that will explode if ignited. Never place batteries in any compartment or near anything that could spark, even a 12 Volt switch. Never smoke or use open flames anywhere near the battery. Secure batteries in a battery box or in a compartment specially designed for battery storage. Wear splash proof goggles and appropriate clothing when performing any maintenance on a battery. In case of a spill or splash, immediately flush the affected area with cold water for 15 minutes and call the poison control center for further instructions. We do not cover batteries under warranty.

When storing a battery, do not place the battery directly on concrete, as the battery will discharge more rapidly.

WARNING

The acid in batteries is highly corrosive and hydrogen gas is produced which is extremely flammable. Avoid placing near a possible ignition source such as open flame or potential spark producing wiring.

WARNING

Before performing any maintenance on the battery, always disconnect the battery, removing the negative (-) cable first and then disconnecting the positive (+).

WARNING

Always disconnect the negative (-) cable prior to working near batteries to reduce risk of arching and igniting.

Battery Storage

When storing the RV for an extended period, fully charge the battery before storage. Batteries will self-discharge over time and are subject to freezing, especially if in a discharged condition. Inspect batteries while in storage every 2 to 3 weeks. Hook up a battery charger at least once a month to prevent discharge and sulfation. An easy solution is to remove the battery completely from the unit during storage and place it at home in a warmer location, such as a garage, so that the battery condition can be monitored and charged as needed during storage periods.

Appliances: See Chapter 4

Bedspreads

Refer to the label attached to the bed spread by the manufacturer. Care instructions should be given. In most instances or whenever in doubt, dry – clean all fabric products such as drapes and bedspreads for best appearance and prolonged life. Washing draperies and bedspreads in washers will cause premature deterioration, fading, shrinkage and / or possible damage.

Blinds and Shades

Venetian blinds and day / night shades should be vacuumed regularly with a soft brush attachment. Use of a soft cloth and mild cleaner on blinds will help keep them new looking. For fabric shades, upholstery cleaners are not recommended. Instead, spot clean when necessary, using a mild soap and water solution on area.

Cabinet Doors and Drawers (Wood)

The cabinet doors and drawer fronts are solid wood and should be cared for similar to the fine furniture in your home. Using a quality furniture polish will help maintain the beauty and luster of the wood as well as keep the wood from drying out. The accidental scratches can be covered satisfactory with a good quality commercial furniture scratch remover.

Carpeting

The carpeting installed is made of nylon and is easy to maintain. Vacuum regularly to remove abrasive grit. Water based spills and spots should be removed immediately with a damp cloth. Grease or oil based stains and spots should be spot cleaned with a good commercial spot cleaner made for this purpose. If complete shampooing is desired, it is best to have it done be a competent professional carpet cleaner. Never soak or water-log your carpeting.

Ceilings and Walls

Clean only with a mild detergent in warm water, using a damp cloth to clean the ceiling. Never use strong chemicals or excessive water / moisture, as either can damage the ceiling or walls.

Countertops

Most countertops are made of high-pressure plastic laminates and are highly resistant to normal spills and scuffs. Soap and lukewarm water or a mild, non-abrasive cleaner are recommended. Avoid use of abrasive pads and scouring powders, which can dull the surface and make it more stain-prone. Always use a chopping block or cutting board when using knives. Pots and pans straight from the burner or oven should be placed on lined hot pads and not directly on the counter surface.

Solid Surface Countertops

The solid surface composite countertops can be cleaned with soap and mild detergents, which will remove most stains. Do Not Use products containing

bleach. Stubborn stains may require the use of a white Scotch Brite pad and a non-abrasive cleaner like Soft Scrub. Scratches may be removed carefully using a green Scotch Brite pad and an abrasive cleaner like Ajax or Comet. Cover an area large enough to blend the area needing repair, using a circular motion while applying.

Laminate Countertops

Dust and clean with a soft, damp cloth or chamois, wiping surface gently. Use pure soap and lukewarm water to clean. The manufacturer also suggests cleaners, like 409™ or Fantastik™. Strong soaps and abrasive cleaners should not be used. Light scratches can be removed by waxing with Simonize™ wax.

Draperies

Draperies and upholstery fabrics should always be dry cleaned like any other fine fabric by a competent dry cleaning establishment. Many window treatments and bedspreads are fire retardant. When dry cleaning, be sure to inform attendant of fire retardant items. Spots and stains should be removed with a non-water based commercial spot remover manufactured for this purpose.

Faucets and Fixtures

To protect the finishes on your kitchen and bath faucets and fixtures, use only a damp soft cloth or sponge. Do not use abrasive cleaners or materials as they can damage the finish.

Flooring, Vinyl

For routine cleaning, sweep or vacuum regularly. Follow by using a damp mop with warm water and clean a small area at a time. Rinse the mop frequently as to not redistribute the dirt picked up. If washing is needed, use a quality product designed for no-wax flooring. To polish the floor, do not use solvent-based waxes or polishes as damage to the flooring may result. Use only polishes recommended for no-wax flooring.

Flooring, Plank

For routine cleaning, sweep or vacuum regularly to remove loose dirt / grit. Lightly soiled floors can be damp-mopped with clear water. Do not use cleaners that contain abrasives or solvents or promise one-step “mop and polish”. Permanent damage may result from use of these cleaners. Wipe up any spills immediately. Certain inks, mustards, polishes, tars, paints, varnishes etc., can cause stains. If normal clean up does not remove the substance, use a cloth dampened with mineral spirits and wipe lightly. DO NOT USE MINERAL SPIRITS NEAR A FIRE HAZARD

Glass and Mirrors

Clean glass and mirrors as you would at home using a cleaner designed for glass. To reduce “spotting” on outside windows, use a squeegee promptly after rinsing with water. For stubborn spots, cleaning with a mixture of vinegar and water is recommended and is safe for most finishes.

Fabric and Upholstery

Do not laundry upholstery fabrics. Blot up stains promptly and use an upholstery cleaner or mild solvent, depending on the stain. Never soak the fabric and use as little water as possible. Blot rather than rub. Towel dry or have professionally cleaned. Upholstery can be vacuumed regularly using a soft brush attachment.

Sinks, Tubs and Toilets

Many of these products are made of acrylics, plastics or composite materials and use of non-abrasive cleaners is recommended to protect the finish. Use of harsh cleaning products can cause premature deterioration and/or yellowing of the surface finish.

Maintenance Notes	
Date	**Maintenance Performed**

Item	Each Trip	Each Mo.	3 Mo.	6 Mo.	Each Year	As Req.	Procedures
Fiberglass Exterior		X		X			Wash with warm water and mild detergent Wax with liquid or paste wax
Roof and Roof Components				X	X		Inspect and re-seal as needed Lubricate roof vent mechanism w/light oil & clean completely
Windows and Doors		X	X X		X X		Check vinyl seals when washing exterior Check seals for damage and repair as needed Lubricate door hinges & step components with WD40 Adjust & lubricate window latches w/powdered graphite or light oil Lube door locks & strike pocket, incl. ext. storage & access doors
Seals and Adhesives		X					Inspect and reseal as necessary
LP Gas System					X	X	Check for leaks and road damage Have qualified serviceman check pressures & complete system
Water and Drainage	X	X			X	X	Check hoses, fittings and connections for leaks and signs of wear Check drainage system for leaks and road damage Sanitize system Winterize system depending on local seasonal conditions
Electrical System		X				X X	Check GFCI circuits Perform maint. on generator as outlined in generator manual Check and service batteries
Appliances	X	X					Remove food and ice from refrigerator after each trip Clean fan blades and wash filter on range exhaust hood Check for obstructions and dirt on exterior appliance vents
Safety Equipment	X	X			X		Clean smoke detector components Test smoke detector operation Check fire extinguisher pressure and condition
Carpeting	X					X	Vacuum after each trip Clean
Wood Surfaces		X					Clean pre-finished panels and wood
Weight and Distribution	X						Be sure unit is within specified load limits & weight distribution
Axles (Towable)				X			Mounting bolts should be torqued to 145-155 foot pounds
Wheel Bearings (Towable)					X	X	Repack wheel bearings yearly
Brakes (Towable)				X		X	Check operation and (or uneven wear)

Chapter 10: Chemical Sensitivity; Ventilation

Chemical Sensitivity

After you first purchase your new recreational vehicle and sometimes after it has been closed up for an extended period of time you may notice a strong odor and chemical sensitivity. This is not a defect in your recreational vehicle. Like your home, there are many different products used in the construction of recreational vehicles such as carpet, linoleum, plywood, insulation, upholstery, etc. Formaldehyde is also the by-product of combustion and numerous household products, such as some paints, coatings, and cosmetics. However, recreational vehicles are much smaller than your home and there fore the exchange of air inside a recreational vehicle is significantly less than a home. These products, when new or when exposed to elevated temperatures and/or humidity, may “off-gas” different chemicals, including formaldehyde. This off-gassing, in combination with the minimal air exchange , may cause you to experience irritation of the eyes, nose, and throat and sometimes headache, nausea, and a variety of asthma-like symptoms. Elderly persons and young children, as well as anyone with a history of asthma, allergies, or lung problems, may be more susceptible to the effects of off-gassing.

Formaldehyde

Most of the attention regarding chemical off-gassing surrounds formaldehyde. Formaldehyde is a naturally occuring substance. It is also a key industrial chemical used in the manufacture of the numerous consumer products which we referred to above and used in the construction of recreational vehicles. Trace levels of formaldehyde are also released from smoking, cooking, use of soaps and detergents such as carpet shampoos, cosmetics, and many other household products. Some people are very sensitive to formaldehyde while other may not have any reaction to the same levels of formaldehyde. Amounts released decrease over time.

Ventilation

To reduce or lessen exposure to chemicals from off-gassing it is of utmost importance that you ventilate your recreational vehicle. Ventilation should occur frequently after purchasing and at times when the temperatures and humidity are elevated. Remember off-gassing is accelerated by heat and humidity. open windows, exhaust vents, and doors. Operate ceiling and/or other fans, roof air conditioners, and furnaces and use a fan to force stale air out and bring fresh air in. Decreasing the flow of air by sealing the recreational vehicle increases the formaldehyde level in the indoor air. Please also follow the recommendations contained in Chapter 2 regarding tips to avoid condensation problems. Many of the recommendations contained in Chapter 2 will assist in avoiding exposure to chemicals that off-gas.

Do Not Smoke

Finally, we recommend that you do not smoke inside your recreational vehicle. In addition to causing damage to your recreational vehicle, tobacco smoke releases formaldehyde and other toxic chemicals.

Medical Advice

If you have any questions regarding the health effects of formaldehyde, please consult your doctor or local health department.

Warranty Exclusion

CHEMICAL OFF-GASSING IS NOT A “DEFECT” IN YOUR RECREATIONAL VEHICLE AND IS NOT COVERED BY THE LIMITED WARRANTY. PLEASE FOLLOW THE RECOMMENDATIONS IN THIS SECTION TO ADDRESS THIS CONCERN.

Chapter 11: Tire and Wheels

The importance of Proper Tire Inflation

Your trailer tires and wheels, and tongue or fifth wheel hitch support the entire weight of the trailer and its contents. The tires are also the only contact the trailer has with the road surface. Determining and maintaining proper inflation is the most important factor in maximizing the life of your tires. Driving on a tire that does not have the correct inflation pressure for the trailer load is dangerous and may cause premature wear, tire damage, tread delamination and/or loss of control of the trailer and/or tow vehicle.

An underinflated tire will build up excessive heat that may go beyond the limits of the tire materials. This could result in sudden tire failure. An under-inflated tire will also cause poor vehicle handling, rapid and/or irregular tire wear, and an increased in rolling resistance which results in decreased tow vehicle fuel economy.

The maximum cold inflation pressure for your tires is stated on the tire sidewalls and Federal certification label. Keep your tires inflated to this maximum cold pressure. This reduces the chance of a failure and improves towing stability. Maintaining correct tire pressure for your trailer is of the utmost importance and must be a part of regular vehicle maintenance.

You must weigh your trailer when fully loaded as you expect to use it. You need to weigh all axles together and calculate the hitch weight. You may find that even though the total weight is within the GVWR, one side may be overloaded. For this reason, you must know the weight on each side of the trailer. When you know the weight on each side of the trailer, the combined axle assembly, and the hitch weight, you will be able to manage your loading to be able to maintain good balance and assure good and safe handling on the road. There are some tips to help plan your loading:

» *Do not overload. Experiment with various loads starting with light loads and working up to heavier loads. Take into consideration the load of the fresh water system. The tow vehicle and the terrain will affect the true weight you should carry.*

» *Distribute the load evenly over the axles as much as possible. Keep heavy items low and forward, preferably in the lower storage areas. This will produce a lower center of gravity, and improve road stability.*

» *Distribute the load evenly on each side of the trailer. Place heavier objects opposite the heavier appliances, cabinets, furniture, etc. when possible. Experiment with various load positions until you find the best distribution.*

⚠WARNING

Check tire pressures before traveling. Always check tire pressure when tires are cold. Do not exceed the maximum recommended pressure

⚠WARNING

Keep tires properly inflated. A tire that is run long distances or at high speeds while seriously under-inflated will overheat to the point where the tire may lose air suddenly and/or catch fire, possibly resulting in damage to the vehicle and its contents and/or personal injury.

CAUTION

Tire load ratings are dependent on tire inflation pressures. Under-inflated tires can be damaged and result in a loss of inflation pressure.

» *Avoid loading heavy items in our on the rear of the trailer. This can cause both total weight problems and hitch weight distribution problems.*

» *Secure items so they won't move around while traveling. Make sure all items and materials are properly stored. Close and latch all drawers, cabinet doors, and closet doors. Pull all loose furniture away from cabinets and walls, lay on their side or secure to prevent rubbing during travel.*

» *Carry only as much water as you think you will need while traveling. Water weighs over eight pounds per gallon. Whenever possible, empty the holding tanks before getting on the road.*

» *If you are heading for rough terrain, use heavy packing material in the cupboards to hold plates, glasses, etc. Put a nonskid material beneath heaver items to prevent shifting. Expensive and breakable belongings should be well packed and placed on the floor in the center of the trailer, as the center rides the best.*

» *Store emergency items such as fire extinguisher, first-aid kit, highway warning devices, gloves, etc. in a readily accessible place. Don't bury these items beneath other cargo.*

» *When you have properly loaded your trailer with the things you need for your trip, make a diagram that outlines where things are stored. With this diagram, your list of items and the weight of items, you will be able to find specific items easily and have a handy reference for determining proper weights.*

» *Weigh your trailer after you have loaded it. You may have to do this several times to get it right.*

Check the trailer tires frequently. Tires can lose air over a period of time. In fact, tires can lose 1 to 3 PSI per month. This is because molecules of air, under pressure, migrate through rubber from the inside to the outside. A drop in tire pressure could cause the tire to become overloaded, leading to excessive heat build up. If a trailer tire is under-inflated, even for a short period of time, the tire could suffer internal damage. A flat can go unnoticed on a multiple axle trailer white it is being towed. Running with a flat tire can cause it to catch fire and burn up your rig. With a flat tire as the other tires are supporting the weight of the rig and the flat tire is less noticeable. A quick check can be made by "thumping each tire with a tire iron or rod to make sure they all sound the same. Each time you gas up, walk around the trailer and give a quick check by feeling each tire with your hand. A tire that is getting low will be hotter than the rest. There is no substitute, however, for actually measuring tire pressures to make sure they are all within safe limits. Always check the cold tire inflation pressures before each trip and at least once a week during the trip for proper inflation levels.

The most common causes of tire failure are overloading and underinflation. Both result in excess flexing of the sidewall which can cause heat buildup and eventual tire failure. **Continuing to run with a flat can cause it to catch fire.**
The most important things you can do to avoid tire failures are:
» maintain proper tire pressure

» stay within tire and vehicle load limits
» avoid road hazards if possible
» inspect tires for cuts, slashes, and other irregularities

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared to the inconvenience and safety consequences of a flat tire or other tire failure.

Understanding Tire Pressure and Load Limits

Tire inflation pressure is the level of air in the tire that provides it with load-carrying capacity and affects the overall performance of the vehicle. The tire inflation pressure is a number that indicates the amount of air pressure that a tire requires to be properly inflated. It is difficult to obtain the recommended tire pressure if your tires are not cold. Because tires are designed to be used on more than one type of vehicle, tire manufacturers list the “maximum permissible inflation pressure” on the tire sidewall. This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Checking & Adjusting Tire Pressure

It is important to check your vehicle’s tire pressure at least once a month, always before a trip, and at least once a week while on the road. Not only do tires naturally lose air over time, but they can lose air suddenly if you drive over a pothole or other object, or if you strike the curb. It is difficult to determine tire inflation pressure by looking at the tire. Purchase a tire pressure gauge to keep in your vehicle. Gauges can be purchased at tire dealerships, auto supply stores, and other retail outlets.

The recommended tire inflation pressure is the proper pressure when a tire is cold. A “cold” tire is one that has not been driven on for at least three hours. When you drive, your tires get warmer, causing the air pressure within them to increase. Therefore, to get an accurate tire pressure reading, **you must measure tire pressure when the tires are cold.**

» Refer to the tire sidewalls for the recommended tire pressure. Your trailer may be equipped with optional tires. Always refer to the tire sidewalls for recommended tire pressure.

» Check and write down the pressure in all tires.

» If the pressure is too high in any of the tires, slowly release air by gently pressing on the tire valve stem with the edge of your tire gauge until you get to the correct pressure.

» If the tire pressure is too low, note the difference between the measured tire pressure and the correct tire pressure. You will need to add air to get to the correct pressure.

» Add air to each tire that is under-inflated.

» Check all the tires again to make sure they have the same air pressure.

The air pressure recommended on the tire information placard is the original standard equipment tires only. Your trailer my be equipped with optional-sized tires. Always follow the pressure recommendations stamped in the tire sidewall for any replacement tire.

WARNING

All tires on your trailer should be the same type, size, construction and load rating - do not mix bias-belted and radial tires.

If you have been towing your trailer and think that a tire is under-inflated, fill it to the recommended cold inflation pressure. Remember to recheck and adjust the pressure in all tires when you can obtain a cold reading.

Tire Tread

The tire tread provides the gripping action and traction that prevents your trailer from slipping or sliding, especially when the road is wet or icy. In general, tires are not safe and should be replaced when the tread is worn down to 1/16 of an inch. Tires have built-in tread-wear indicators that let you know when it is time to replace your tires. These indicators are raised sections spaced intermittently in the bottom of the tread grooves. When they appear “even” with the outside of the tread, it is time to replace your tires.

	Condition	Possible Cause	Remedy
	Even Center Wear	Over-Inflation	Check & Adjust Pressure When Cold
	Inside & Outside Wear	Under-Inflation	Check & Adjust Pressure When Cold
	Smooth Outside Wear (One Side)	Loss of Camber or Over-Loading	Check & Unload as Necessary and / or Have Alignment Checked
	“Feathering” Across the Face	Axle Not Square to Frame or Incorrect Toe-In	Square Axles and / or Have Alignment Checked
	Cupping	Loose Bearings or Wheel Balance	Check Bearing Adjustment and Wheel & Tire Balance
	Flat Spots	Wheel Lock-Up	Adjust Bakes

Tire Life

Trailer tires may be worn out even though they still have plenty of tread left. This is because trailer tires may have to carry a lot of weight all the time, even when not in use. It is actually better for the tire to be rolling down the road than to be idle. During use, the tire releases lubricants that are beneficial to tire life. Using the trailer tires often also helps prevent flat spots from developing. The average life of a trailer tire is about five years under normal use and maintenance conditions. After five years, trailer tires may be degraded to the point that they should be replaced, even if they have minimal or no use. Exposure to sunlight (ultra-violet damage)

⚠WARNING

There is a danger of serious injury or death if a tire of one bead diameter is installed on a rim or wheel of a different rim diameter. ALWAYS replace a tire with another tire of exactly the same bead diameter designation and suffix letters.

and high seed towing in hot conditions also reduces tire life. As heat builds up during driving, the tire's internal structure starts to break down, compromising the strength of the tire. Have your tires inspected by a tire supplier to determine if your tires need to be replaced.

Replacement Tires

To maintain tire safety, purchase new tires that are the same type, size, construction, and load rating as the original tires. Look at the tire information placard or the sidewall of the tire you are replacing to find this information. If you have any doubt about the correct size to choose, consult your tire dealer.

Tire Safety Information

This portion of the Owner's Manual contains tire safety information as required by 49 CFR 575.6.

The National Highway Traffic Safety Administration (NHTSA) has published a brochure (DOT HS 809 36) that discusses all aspects of Tire Safety, as required by CFR 575.6. It can be obtained and downloaded from NHTSA, free of charge, from the following web site:

http://www.NHTSA.dot.gov/cars/rules/TireSafety/ridesonit/tires_index.html

Studies of tire safety show that maintaining proper tire pressure, observing tire and vehicle load limits (not carrying more weight in your vehicle than your tires or vehicle can safely handle), avoiding road hazards, and inspecting tires for cuts, slashes, and other irregularities are the most important things you can do to avoid tire failure, such as tread separation or blowout and flat tires.

These actions, along with other care and maintenance activities, can also:

» Improve vehicle handling
» Help protect you and others from avoidable breakdowns and accidents.
» Improve fuel economy
» Increase the life of your tires

Use this information to make tire safety a regular part of your vehicle maintenance routine. Recognize that the time you spend is minimal compared with the inconvenience and safety consequences of a flat tire or other tire failure.

Safety First - Basic Tire Maintenance

Properly maintained tires improve the steering, stopping, traction, and load-carrying capability of your vehicle. Under-inflated tires and overloaded vehicles are a major cause of tire failure. Therefore, as mentioned above, to avoid flat tires and other types of tire failure, you should maintain proper tire pressure, observe tire and vehicle load limits, avoid road hazards, and regularly inspect your tires.

Finding Your Vehicle's Recommended Tire Pressure and Load Limits

Tire information placards and vehicle certification labels contain information on tires and load limits. These labels indicate the vehicle manufacturer's information including:

To avoid vibration or shaking of the vehicle when a tire rotates, the tire should be properly balanced. This balance is achieved by positioning weights on the wheel to counterbalance heavy spots on the wheel-and-tire assembly. A wheel alignment adjusts the angles of the wheels so that they are positioned correctly relative to the vehicle's frame. This adjustment maximizes the life of your tires. These adjustments require special equipment and should be performed by a qualified technician. These adjustments are not performed at the factory and are not covered under warranty.

Recommended tire size
Recommended tire inflation pressure
Vehicle capacity weight (VCW-the maximum occupant and cargo weight a vehicle is designed to carry)
Front and rear gross axle weight ratings (GAWR-the maximum weight the axle systems are designed to carry)

Both placards and certification labels are permanently attached to the trailer on the forward half of the left side, and are easily readable from outside the vehicle without moving any part of the vehicle.

Tire Repair

The proper repair of a punctured tire requires a plug for the hole and a patch for the area inside the tire that surrounds the puncture hole. Punctures through the tread can be repaired if they are not too large, but punctures to the sidewall should not be repaired. Tires must be removed from the rim to be properly inspected before being plugged and patched.

Tire Fundamentals

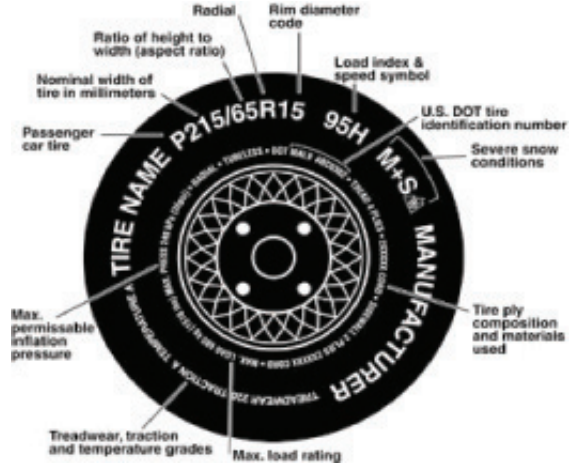
Federal law requires tire manufacturers to place standardization information on the sidewall of all tires. This information identifies and describes the fundamental characteristics of the tire and also provides a tire identification number for safety standard certification and in case of a recall.

Tire Label Information

P - The “P” indicates the tire is for passenger vehicles.
NOTE: Passenger car tires are not recommended for use on trailers.

LT - “LT” indicates the tire is for light trucks.
NOTE: Light truck tires are not recommended for use on trailers.

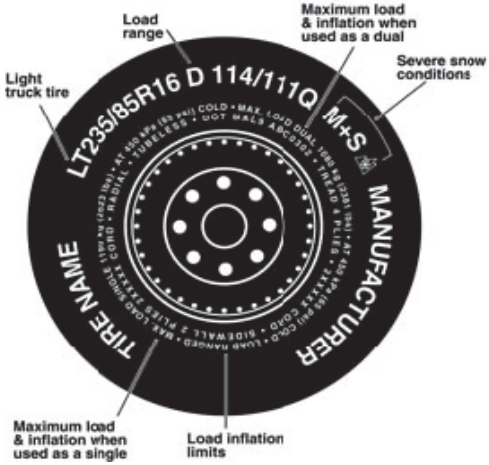
ST - “ST” is an indication the tire is for trailer use only.



Next number - This three-digit number gives the width in millimeters of the tire from sidewall edge to sidewall edge. In general, the larger the number, the wider the tire.

Next number - This two-digit number, known as the aspect ratio, gives the tire's ratio of height to width.

R - The "R" stands for radial. Other tire designs may be "bias ply" or "bias belted" and are designated by other letters.



Next number - This two-digit number is the wheel or rim diameter in inches. If you change your wheel size, you will have to purchase new tires to match the new wheel diameter.

Next number - This two- or three-digit number is the tire's load index. It is a measurement of how much weight each tire can support. You may find this information in your owner's manual. If not, contact a local tire dealer. Note: You may not find this information on all tires because it is not required by law.

Speed Rating - The speed rating denotes the top speed at which a ***passenger care*** tire is rated. A speed rating will not be found on "ST" tires used on trailers. All "ST" tires are speed restricted to 65 mph. Never operate a vehicle in an unsafe or unlawful manner. Tire speed ratings (if indicated) should never be associated with the ability of the vehicle to handle the speed for which the tire is rated.

U.S. DOT Tire Identification Number - This begins with the letters "DOT" and indicates that the tire meets all federal standards. The next two numbers or letters are the plant code where it was manufactured, and the last four numbers represent the week and year the tire was built. For example, the numbers 3197 means the 31st week of 1997. The other numbers are marketing codes used at the manufacturer's discretion. This information is used to contact consumers if a tire defect requires a recall.

IMPORTANT SPECIAL NOTICE

Your trailer is equipped with tires designated as "ST". This designation means that the tires are built specifically for trailer applications. They are correct for your trailer and the maximum loads the trailer was designed and rated to carry.

Tire industry standards require that tires with the ST designation are speed restricted to 65 MPH under *normal* inflation and load conditions. Unless a different speed restriction is indicated on the sidewall of the tire, it is best that you not operate your trailer at speeds above 65 mph.

NOTICE

Although tires designated "LT" are sometimes used on trailers, they are not recommended for use on your trailer and should not be considered as replacements for the original equipment "ST" designated tires.

Tire Ply Composition and Materials Used - The number of plies indicates the number of layers of rubber-coated fabric in the tire. In general, the greater the number of plies, the more weight a tire can support. Tire manufacturers also must indicate the materials in the tire, which include steel, nylon, polyester, and others.

Maximum Load Rating - This number indicates the maximum load in kilograms and pounds that can be carried by the tire.

Maximum Permissible Inflation Pressure - This number is the greatest amount of air pressure that should ever be put in the tire under normal driving conditions.

Vehicle Load Limits

Determining the load limits of a vehicle includes more than understanding the load limits of the tires alone. A Federal Certification Label is located on the forward half of the left (road) side of the unit. The certification label will indicate the vehicle's gross vehicle weight rating (GVWR). This is the maximum weight a particular axle can carry. If there are multiple axles, the GAWR of each axle will be provided. In the same location as the certification label described above, there is a vehicle placard. This placard provides tire and loading information. In addition, this placard will show a statement regarding maximum cargo capacity.

Cargo Capacities

Cargo can be added to the vehicle, up to the maximum weight specified on the placard. The combined weight of the trailer and the cargo is provided as a single number. In any case, remember: ***the total weight of a fully loaded vehicle can not exceed the stated GVWR.***

Water and propane also need to be considered. The weight of fully filled propane containers is considered part of the weight of the RV before it is loaded with cargo and is not considered part of the disposable cargo load. Water however, is a cargo weight and is treated as such. If there is a fresh water storage tank of 100 gallons, this tank when filled would weigh about 800 pounds. If more cargo is being transported, water can be off-loaded to keep the total amount of cargo added to the vehicle within the limits of the GVWR so as not to overload the vehicle.
Understanding this flexibility will allow you, the owner, to make choices that fit your travel and camping needs.

When loading your cargo, be sure it is distributed evenly to prevent overloading front to back and side to side. Heavy items should be placed low and as close to the axle positions as reasonable. Too many items on one side may overload a tire. The best way to know the actual weight of the vehicle is to weigh it at a public scale. Talk to your RV dealer to discuss the weighing methods needed to capture the various weights related to the RV. This would include weights for the following: axles, wheels, hitch or pin and total weight.

How Overloading Affects Your RV and Tires

The results of overloading can have serious consequences for vehicle safety. Too much weight on your vehicle's suspension system can cause spring, shock absorber, or brake failure, handling or steering problems, irregular tire wear, tire failure or other damage. An overloaded vehicle is hard to drive and hard to stop. In cases of serious overloading, brakes can fail completely, particularly on steep hills. The load a tire will carry safely

is a combination of the size of tire, its load range, and corresponding inflation pressure. Excessive loads and/or under-inflation cause tire overloading and, as a result, abnormal tire flexing occurs. This situation can generate an excessive amount of heat within the tire. Excessive heat may lead to tire failure. It is the air pressure that enables a tire to support the load, so proper inflation is critical. Since RVs can be configured and loaded in many ways, air pressures must be determined from actual loads (determined by weighing) and taken from the load and inflation tables provided by the tire manufacturer. These air pressures may differ from those found on the certification label. However, they should never exceed the tire limitation for load or air pressure. If you discover that your tires cannot support the actual weights, the load will need to be lightened.

Tire Safety Tips

Preventing Tire Damage

Slow down if you have to go over a pothole or other object in the road. Do not run over curbs or other foreign objects in the roadway, and try not to strike the curb when parking.

Tire Safety Checklist

» Check tire pressure regularly (including the spare), at least once a month and before going on any trip.
» Inspect tires for uneven wear patterns on the tread, cracks, foreign objects, or other signs of wear or trauma.
» Remove bits of glass and foreign objects wedged in the tread.
» Make sure your tire valves have valve caps.
» Do not overload your vehicle. Check the Tire Information and Loading Placard or User's Manual for the maximum recommended load for the vehicle.

STEPS FOR DETERMINING CORRECT LOAD LIMIT

1. Locate the statement "The weight of cargo should never exceed XXX lbs" on your vehicles placard.
2. The figure stated on the placard is the available amount of cargo load capacity. The weight of all cargo loaded in the vehicle may not safely exceed this figure.
3. Determine the combined weight of cargo being loaded in the vehicle. That weight may not safely exceed the available cargo capacity.

For further information about wheel and tire safety:

1-888-327-4236 (TTY: 1-800-424-9153)

http://www.safercar.gov and

NHTSA
1200 New Jersey Avenue S.E.
Washington, DC 20590

Chapter 12: Ramp Trailers

Ramp Trailer Weight Distribution

All loaded trailers must remain within GVWR and GAWR limits. Proper load distribution is especially important for ramp/cargo trailers. These trailers are designed to carry a variety of cargo and/or vehicles in the cargo storage area. These cargo items are typically heavy and you must consider how they are loaded. Incorrectly loaded trailers can have too little weight resting on the hitch or pin and can become unstable when towing. Therefore, you must maintain a hitch weight percentage of 10-15% for travel trailers and 15-25% for fifth wheels. Keep 60% of the cargo weight forward of the axle(s) centerline.

Ramp Trailer Loading

The rear cargo door/loading ramp gives you complete access to the trailer cargo area. When lowered, the loading ramp allows you to easily load rolling cargo, bicycles, small motorcycles and ATVs, and small vehicles.

This section outlines the safety precautions you should take when loading and unloading cargo and vehicles, as well as loading/unloading procedures, techniques and tips.

Ramp Trailer Loading Safety

The loading ramp/door area of your trailer can be a very hazardous part of your recreational activities. Many combinations of hazards and a large volume of activities occur in this area. Some of these hazards are:

Ramps and inclines
Overhead obstructions
Dissimilar surfaces that are often wet and slippery
Poor lighting during night or early morning activities
Other vehicular traffic
Pedestrians
Restricted views
Awkward, heavy or unbalanced loads
Sheer drops
Trailer creep
Congested staging areas
Accumulations of empty containers and debris

These are all hazards which can all be present at the same time within a very confined area. You need to be aware of these potential hazards when loading, unloading and rigging your cargo. Your continuous attention to safety measures will help prevent accidents and possibly serious injuries and property damage.

The biggest reason to put a priority on loading safety is not so much related to the frequency of accidents as it is to the potential severity of injuries that can occur in these types of accidents. The kinds of injuries sustained when a load tips over or falls from the ramp(s) or falls out of the trailer, or those that occur if the load shifts unexpectedly during travel tend to be very serious and sometimes fatal. You can prevent these types of accidents by paying attention to what you are doing and thinking through the consequences of poor loading.

Poor hazard assessment decisions are directly responsible for many accidents. You can help minimize these risks, avoid hazards, and enjoy your recreational activities safely by using an effective decision-making strategy:

» ***Look around you and your situation.*** Get a good idea of what's going on around you before you act.

» ***Identify hazards*** or specific problems in your path. Equipment, materials, debris, other vehicles, children, pets, or any number of other things may be in your way when you load or unload cargo or vehicles.

» ***Predict*** what may happen and think of the consequences of your actions. If you are loading/unloading alone, are you physically capable of handling the load safely and keeping it under control? Ask yourself what would happen if your load falls over, slips off the ramp or falls out of the trailer. If you are unable to control your cargo, what will happen to it, you, and any other people, equipment, or materials if/when it becomes uncontrollable? If you tie down your load, what will happen if a tie down comes loose? What will happen if all tie downs come loose? What will you do if someone else does something dangerous during your unloading/unloading?

» ***Decide what to do*** based on your abilities and the capabilities of your equipment. Always use proper lifting techniques, and personal protection equipment as necessary such as gloves, helmets, kneepads and other protective clothing. Be sure your cargo does not exceed the capacity of your loading rant and the trailer.

Here are some general safety rules about loading and unloading your cargo trailer. Other safety items will be covered throughout this section.

» ***Always consider the equipment you are loading. After use, it may be hot, wet, slippery, dirty or in some other condition that may be potentially hazardous.***

» ***In all situations, follow the loading and weight guidelines in the "Loading and Weighing" chapter of this Owner's Guide. Never exceed the GAWR and GVWR ratings of either your trailer or your tow vehicle.***

» ***Connect to the tow vehicle and use wheel chocks in addition to the forward landing gear/jack of spotted trailers when loading and unloading to prevent potential forward or backward movement when loading or unloading.***

» ***Be sure the work/loading area is well lit. Avoid loading/unloading at night or in conditions of poor visibility.***

» ***Do not allow anyone who is not engaged in loading or unloading to be inside the trailer cargo area while loading/unloading.***

» ***Visually inspect the trailer before loading. A damaged spot in the floor can cause cargo to be unstable and damaged or missing tie down rings will prevent you from securing your load properly.***

» ***Use caution tape, traffic cones or portable barricades to designate staging and loading areas in high activity situations where other vehicles and/or pedestrians are present.***

» ***Keep the loading area clean and free of clutter and debris. Clean up water and oil on the floor.***

Ramp Door Load Limit
2000 lbs total

Tiedown D-ring Load Rating
1500 lbs. each

Tiedown Track Load Rating
4000 lbs. per track

Cargo floor tiedown rail

- » ***Designate areas at your campsite or activity area for storage of trash, tools, equipment, supplies and expendable containers such as food, beverage, oil and fuel containers.***
- » ***Give special attention to large loads that may obstruct the view of the loading crew.***
- » ***Wear boots that provide adequate ankle support and slop resistant tread design, and hand protection when loading/unloading.***
- » ***Always communicate with the person doing the loading. Know what the plan is and make sure you agree.***
- » ***Maintain eye contact with other persons involved at all times during loading/unloading; making sure they know where you are.***
- » ***Slow down and pay attention; never hurry around loading/unloading operations.***
- » ***Train everyone in your travel group on the hazards of loading and unloading.***
- » ***Establish and enforce compliance to all safety procedures.***

Chocks and Blocks

Chocks and blocks prevent accidental or unintended movement of mobile equipment and cargo while you are loading, unloading, hitching, unhitching, or performing service or maintenance. Wheel **chocks** are wedge shaped blocks placed in front of or behind the rear wheels of a trailer or tow vehicles to prevent the trailer from moving while the trailer is being loaded. “Trailer creep” occurs when the sideways and vertical forces exerted each time a load enters and exits the trailer cause the trailer to slowly move away from the loading area. The weight and speed of loading can affect trailer creep. The grade the trailer is parked on, the softness of the suspension, and whether the trailer has been dropped off or of it is still connected to the tow vehicle are also factors. Loading accidents can also occur when a driver prematurely pulls away while the trailer is still being loaded/unloaded.

Always hitch the trailer to the tow vehicles, and use wheel chocks or other vehicles-restraining devices when loading and unloading the trailer. Keep spare chocks on hand. They often get left behind or lost during outdoor activities. Chocking the wheels of a truck, trailer, or other piece of mobile equipment provides a physical stopper to the wheels to prevent runaways that can crush and injure people and damage equipment..

When chocking, use wheel chocks of the appropriate size and material to securely hold the vehicle. Don’t use lumber, cinder blocks, rocks, or other make shift items to chock. Make it easy to find and use the correct chocking equipment; store chocks inside the trailer or tow vehicles. Keep chocks available at places where you typically load and unload.

Use extra caution when loading from the ramp. If the trailer rolls away, you and the equipment you are loading can fall with severe injuries or death. Never load equipment from the ramp into the trailer until you unsure that the wheels are properly chocked. Ensure that the trailer floor is in good condition and that it can support the weight of the equipment you are loading.

Blocking stabilizes loaded cargo to prevent shifting and trailer overturns. If the load shifts while in motion, the sudden shift in position and center of gravity may cause towing instability possibly causing the trailer to overturn. Securely block all cargo, not just wheeled equipment and round or oddly shaped items. Block items separately and on all four sides using wood blocks thick enough to prevent cargo movement. Use tie downs and D-rings/carabiners strong enough to secure the load. Avoid using other cargo as a block.

Cargo Placement and Restraint

Cargo that is likely to roll (vehicles, tool chests, barrels, etc.) should be restrained by chocks, blocks, wedges, a cradle or other equivalent means to prevent rolling. Whatever you use to prevent rolling should not be able to be accidentally unfastened or loosened while the trailer is in motion.

Proper Use of Tiedowns

Avoid using tiedowns and securing devices with knows. Be sure to attach and secure each tiedown so that it can't come loose, unfastened, opened or released while the trailer is in motion. Also, use edge protection whenever a tiedown could be damaged or cut at the point where it touches an article of cargo. Avoid using "bungee" cords on D-rings.

Tiedown Minimum Working Load Limit

The working load limit of a tiedown, associated connector, or attachment mechanism is the lowest working load limit of any of its components (including any tensioner device), or the working load limit of the anchor points to which it is attached, whichever is less. When you choose tiedown hardware, choose items that are strong enough to hold the load you are securing. The load limit of each tiedown used should be at least on-half the working load limit of each tiedown that foes from an anchor point on the trailer to an attachment point on an article of cargo., Check the tiedown manufacturer's specifications to determine working load limits.
NOTE: Tiedown hardware is not supplied with your trailer.

Minimum Number of Tiedowns

When an article of cargo is not blocked or positioned to prevent movement in the forward direction, the number of tiedowns needed depends on the length and weight of the articles. In all cases, use enough tiedowns to secure the cargo from moving in any direction. Heavy tool chests or cabinets may require tiedowns around the bottom, middle and top to secure them. Be sure to lock or secure drawers in these chests or cabinets so they can't open while traveling. Keep handle bars, mirrors, etc. away from the trailer interior walls. The walls can be damaged by contact with hard, sharp objects.

Cargo Loading Procedure
Rear Door/Loading Ramp Operation

1. **Hitch the trailer to a tow vehicle before loading and unloading the rear cargo area.** Select a parking sire where the edge of the rear door/loading ramp will rest entirely on a flat, level surface, and the corners of the door will be supported. Avoid soft sand or mud surfaces. When the trailer is loaded, the added cargo weight may cause the trailer is loaded, the added cargo weight may cause the trailer and/or tow vehicle to become stuck.

2. Level and stabilize the trailer.

⚠CAUTION

The rear cargo door weights approximately 200 pounds. It is designed for two person operation.

The maximum cargo capacity of the rear cargo door/ramp is 2000 pounds.

WARNING

When the trailer is unhooked from the tow vehicle, lower and check the stabilizing jacks before using the loading ramp. Failure to do so could cause the trailer to tip back as the load is shifted to the rear of the cargo area causing property damage, personal injury, and/or death. Hitch the trailer to a two vehicles before loading and unloading the rear cargo area.

WARNING

It is not safe for persons or pets to occupy the vehicle storage area while vehicles are present. Failure to follow these important precautions may result in serious injury or death.

WARNING

There is a hazard of serious personal injury when using a loading ramp. Never ride motorized cargo up a loading ramp.

WARNING

It the motorized cargo loses traction and spins sideways, it may slip sideways off the ramp, tipping sideways, and possibly falling on the rider causing injury.

3. Unlock the rear door/loading ramp and carefully lower it to the ground.
4. If equipped with a power bunk, raise both bunks fully.
5. Move things out of the way of your cargo, whether you are loading, or unloading. Have any idea where your cargo will be positioned after your load/unload activities.
6. Use caution and proper lifting techniques when loading and unloading items from the cargo area.
7. Use extreme caution when loading/unloading ATV's. motorcycles, or other vehicles ("motorized cargo" or "vehicle(s)"). These machines are generally heavy, and may be hot from operation and/or covered with dirt, oil, or other substances that may make them slippery. See the "Special Procedures for Loading and Unloading Motorized Cargo" for more details.
8. Make certain that the door seals and hinge area are free of any debris, such as sand or snow before closing the rear door/loading ramp.
9. Inspect the hinges, assist spring, and latch mechanism before reach trip for signs of wear or damage, and make any needed repairs for safe operation and towing.

Loading and Unloading Motorized Cargo

⚠ Any motorized vehicle or any motorized equipment powered with flammable liquid can cause fire, explosion, or asphyxiation if stored or transported within the recreational vehicle. To reduce the risk of fire, explosion, or asphyxiation:

⚠ Passengers shall not ride in the vehicle storage area while vehicles are present.

⚠ Occupants shall not sleep in the vehicle storage area while vehicles are present.

⚠ Doors and windows in walls of separation (if installed) shall be closed while the vehicles are present.

⚠ Fuel shall be run out of engines of stored vehicles after shutting off fuel at the tank.

⚠ Motor fuel shall not be stored or transported inside this vehicle.

⚠ The vehicle storage area shall be ventilated.

⚠ Gas appliances, pilot lights, or electrical equipment shall not be operated when motorized vehicles or motorized equipment are inside vehicle.

⚠ FAILURE TO COMPLY COULD RESULT IN AN INCREASED RISK OF FIRE, EXPLOSION, ASPHYXIATION, DEATH OR SERIOUS INJURY.

Many recreation ATV or motorcycle accidents and injuries happen while loading or unloading. Steep inclines, unstable ramps, power and a short stopping area are what make loading motorized cargo difficult and unsafe.

There is no absolute safe way to drive your motorized cargo into the trailer. Take the following steps to aid in reducing the risks associated with transporting, storing, or occupying the trailer with motorized equipment and vehicles:

- ***Wear personal protective equipment while loading and unloading vehicles to/from the trailer. This includes but is not limited to, an approved motor vehicle helmet, leather boots, appropriate gloves, and eye protection.***
- ***Never stand in the path of equipment when loading/unloading with the ramp, and keep bystanders away from the ramps.***
- ***Keep body parts completely clear of the ramp door hinge pinch area at all times.***
- ***Check parking brakes on the vehicle(s) you are loading/ unloading, and on the tow vehicle.***
- ***Inspect ramp and trailer floor/loading area for cracks, damage, oil or other debris that may cause slippage.***
- ***Do not allow persons or pets to ride inside the vehicle storage area at any time.***
- ***Close doors and windows in separation walls while the vehicles are present.***
- ***Close tank fuel valves and operate the engine(s) to run fuel out of engine(s) of stored vehicles.***
- ***Do not store or transport motor fuel anywhere inside the trailer.***
- ***Ventilate the interior of the trailer to reduce the risk of fire, explosion, or asphyxiation.***
- ***Do not operate gas appliances, pilot lights, or electrical equipment when motorized vehicles or motorized equipment are inside the trailer. FAILURE TO COMPLY COULD RESULT IN AN INCREASED RISK OF FIRE, EXPLOSION OR ASPHYXIATION.***
- ***Load and store your equipment and motorized vehicles according to the "Loading and Weighing" chapter in this Owner's Guide.***
- ***During transit, secure motorized vehicles and motorized equipment so that items do not move while in transit.***
- ***Remove carpet from section where fueled vehicles or motorized equipment will be stored.***

Loading Technique – Ramp Positioning

The ramp angle from the trailer floor to the ground affects the risk when loading/unloading cargo. If the ramp angle is reduced, and all other conditions remain the same, risk is reduced. Always try to reduce the loading ramp angle – the shallower the ramp angle, the easier cargo loading will be. Position the trailer to take advantage of any terrain

⚠WARNING

CARBON MONOXIDE GAS CAN KILL YOU. Fuel-burning devices such as ATVs or motorcycles that burn gasoline, diesel, or other fuels produce carbon monoxide when they are operating. Carbon monoxide gas is invisible, odorless, and colorless. Dangerous levels of carbon monoxide gas can accumulate in a trailer which cannot be detected by sight, smell, or taste.

Even small quantities of carbon monoxide can cause carbon monoxide poisoning and suffocation, which will cause death, serious injury, or permanent disability. Exposure to high concentrations of carbon monoxide for even a few minutes will also cause death, serious injury, or permanent disability.

DO NOT start ATVs, motorcycles, or other fuel burning devices while they are located in your trailer.

features that will help reduce the ramp angle. In all cases, be sure the ends of the ramp door can be fully supported.

Always position the loading ramp so the ends in contact with the ground are level or at the same height. An uneven ramp may cause the cargo to tip over sideways during loading/unloading.

WARNING

Do not load motorized cargo (motorcycles, ATVs, etc.) by riding them up the ramp door. Loss of control could cause serious personal injury. CrossRoads does not recommend loading motorized cargo under power.

Loading Under Power

Motorized cargo should be walked up the ramp. When preparing to load the vehicle into the trailer, the operator's hands should be positioned on the controls so as to keep the vehicle in control during loading.

1. Shift into lowest gear before ascending ramps.
2. Align wheels with ramps both loading and unloading.
3. Approach straight on, not on an angle. If you are off to one side and the ground is uneven where the ramp touches the ground, an unbalanced situation can occur.
4. The operator should apply throttle smoothly and climb the ramp at low speed. Too much or sudden increases in throttle will cause the vehicle to be harder to control and may cause the vehicle to impact the front of the trailer cargo are or over turn.
5. Stop when fully in the trailer. Keep handle bars, mirrors, etc. away from the trailer interior walls. The walls can be damaged by contact with hard, shard objects.
6. After loading, close the fuel valve and run the engine until it stops (motorcycles and ATVs). Turn the ignition key off and remove it. Set the parking brake. For manual clutch machines, leave the machine in gear.
7. Secure the vehicle with tie downs. The attachment points you select on your equipment must be strong enough to support the weight of the equipment. Usually attachment points that are low and centered on the equipment frame will be good. An attachment to a decorative piece of chrome or plastic will usually not be a good tie-down point. Consider any leverage action that may occur. An attachment point past the center of the equipment could cause the equipment to either swing around or flip over, causing damage to the equipment, or personal injury. If you have any doubt about the attachment point you have selected, stop and find a better attachment point.

WARNING

Failure to properly secure cargo could cause property damage, injury, and/or death.

Secure The Load

Install blocking devices in the front, back, and on both sides of the wheels to keep it from rolling. This block is strictly an additional safety precaution and does not reduce the need for strapping the vehicle in securely.

Use a minimum of three tiedowns to secure the vehicle to the trailer. Use on tie down to secure the front of the vehicle to the trailer. Use two tiedowns to secure the rear of the vehicle to the trailer. Four tiedowns (one at each corner) are preferred.

Attach tiedown hooks to the vehicles frame, not to an accessory such as a mirror, handle bar, pedal, etc. Hooks on the other end must be attached to vehicle cargo anchors installed in the trailer.

For transport, motorized cargo with manual transmissions should be left in first gear.

Vehicles with automatic transmissions should be in the park position. The vehicle's ignition key should be turned off and removed, the parking brake set, the run/stop switch in the stop (or off) position and the fuel lever turned to the off position.

The Safest Way To Unload Your Motorized Cargo

The safest method of unloading is to push the vehicle down the ramp, carefully braking to ensure control of the vehicle.

If you loaded your vehicle forward (front in) that means you will unload it in reverse. Driving a motorized vehicle backwards down a hill (the ramp) is not recommended. A slight turn of the handle or slip of a wheel can cause your vehicle to fall, tip or roll sideways. If you are on or in the vehicle you can be injured or killed. Unload the vehicle safely as follows:

1. Be sure the back tires of the vehicle are aligned with the ramp, and there are no people, pets, or obstructions in the unloading area at the end of the ramp. Assure that the ground surface will support the vehicle, and that the vehicle cannot roll away uncontrolled.

2. Stand at the front of the vehicle.

3. Push the vehicle backward in line with the ramp.

4. As the rear tires start down the ramp let go of the vehicle and let it roll backwards (don't try and slow or control the vehicle as this can cause injury).

Fuel Transfer System

A fuel transfer system allows you to store gasoline for use in motorcycles, snowmobiles, ATV's or other vehicles and equipment while at a campsite. This system consists of a fuel tank, fuel tank filler, fuel gauge, fuel transfer pump, fuel transfer valve and hose with fill nozzle. A master pump switch is located on the inside control panel and an emergency shutoff switch is located on the trailer frame rail near the fuel transfer pump. A metal ground clip reduces the possibility of static electricity discharge between the fuel station and the equipment being fueled.

To fill the tank, removed the fuel filler cap and fill the tank with the grade of gasoline required by your equipment. When replacing the fuel fill cap, be sure it seats squarely and turn it firmly to lock it on the fill pipe neck.

DANGER

Do not smoke when filling the tank. Before dispensing fuel, turn off all engines and fuel burning appliances and ground the trailer. Do not dispense fuel within 20 feet of an ignition source.

DANGER

Potentially explosive fuel vapor may be present at fuel filling stations and during refueling of equipment with the fuel transfer system. Never enter a fuel filling station or refuel equipment if your furnace or water heater is operating on propane. Both the flame and the igniters in the burners of these appliances are sources of ignition, and could cause an explosion. These appliances must be turned OFF before entering a fuel filling station or refueling equipment. Turning off the propane main tank valve only is not sufficient. The appliances must be OFF at their electrical operating switches.

DANGER

Any motorized equipment powered with flammable liquid can cause fire and explosion or asphyxiation if stored or transported inside the trailer. To reduce the risk of fire, explosion or asphyxiation:

1. **Do not allow passengers to ride inside the storage area at any time.**
2. **Prior to storing vehicles in the trailer, run fuel out of the engine after shutting off fuel at the vehicle fuel tank.**
3. **Do not store or transport any motor fuel inside the trailer.**
4. **Ventilate the interior of the trailer to reduce the risk of fire, explosion or asphyxiation. Open the ventilation panels on either side of the cargo area.**
5. **Do not operate propane appliances, pilot lights, or electrical equipment when motorized vehicles or motorized equipment are inside the trailer. Set the cargo electrical disconnect switch to OFF.**

Fuel Transfer System Safety

Static electricity-related incidents when refueling are extremely unusual. They appear to happen most often during cool or cold and dry climate conditions. In rare circumstances, these static related incidents have resulted in a brief flash fire occurring at the fill point. You can minimize these and other potential fueling hazards by following sage refueling procedures.

A build-up of static electricity can be caused by re-entering a vehicle during fueling, particularly in cool or cold and dry weather. If you return to the fuel fill pipe during refueling, the static may discharge at the fill point, causing a flash fire or small sustained fire with gasoline refueling vapors.

If you cannot avoid getting back into the vehicle, always first touch a metal part of the vehicle with a bare hand, such as the door, or some other metal surface, away from the fill point upon exiting the vehicle.

Here are some additional refueling safety guidelines when refueling your vehicle or filling up gasoline storage containers:

» Turn off vehicle engines. Disable or turn off any auxiliary sources of ignition: the trailer furnace, water heater, cooking unit, and any pilot lights. Turn off main propane valve.

» Do not smoke, light matches or lighters while operating the refueling system, or when using gasoline anywhere else.

» Use only the refueling latch provided on the gasoline dispenser nozzle.

» Never jam or otherwise try to lock the refueling latch on the nozzle open.

» Do not re-enter your vehicle during refueling. If you cannot avoid reentering your vehicle, discharge any static build-up before reaching for the nozzle by touching something metal with a bare hand – such as the vehicle body or frame – away from the nozzle.

» In the unlikely event a static-caused fire occurs when refueling, leave the nozzle in the fill pipe and back away from the vehicle. Turn off the fuel pump master switch immediately.

» Do not over-fill or top-off your vehicle tank, which can cause gasoline spillage.

» Never allow children under licensed driving age to operate the pump.

» Avoid prolonged breathing of gasoline vapors. Use gasoline only in open areas that get plenty of fresh air. Keep your face away from the nozzle or container opening.

» Never siphon gasoline by mouth. Never put gasoline in our mouth for any reason. Gasoline can be harmful or fatal if swallowed. If someone swallows gasoline, do not induce vomiting. Contact an emergency medical service provider immediately.

» Keep gasoline away from your eyes and skin; it may cause irritation.

» Remove gasoline-soaked clothing immediately.

» Use gasoline as a motor fuel only. Never use gasoline to wash your hands or as a cleaning solvent.

Fuel Transfer System Operation

To operate the fuel transfer system (also see the "Fuel Pump Owner's Manual" in your Owners Information Package):

1. Lower the tongue jack or 5th-wheel jacks to the ground. This will electrostatically ground the trailer to reduce the possibility ot static discharge while refueling.

2. Set the cargo area disconnect switch to ON.

3. Close the vents in the side of the trailer to prevent fuel vapor from entering the trailer.

4. Press the fuel transfer pump master/timer switch to ON. Each press of the switch allows the pump to run for 5 minutes. When the pump stops, press again in necessary for another 5 minute run.

5. Attach the ground clip securely to a bare metal part of the equipment to be fueled (frame, handle bar, axle bolt, etc.)

6. Remove the fuel hose and nozzle from its compartment. An automatic bypass valve prevents pressure buildup when the pump is on with the nozzle closed.

7. Place the nozzle into the equipment fuel filler and squeeze the handle to allow fuel to flow. Be careful not to overflow the equipment fuel tank. Wipe up any spilled fuel.

8. When finished, release the nozzle handle, return the nozzle to its compartment.

9. Lock the fuel transfer nozzle compartment to prevent unauthorized use. ***The nozzle compartment must be locked at all times when not dispensing fuel.***

10. When you are finished with all the fueling, turn off the pump master switch.

All parts of the fuel transfer system including bud not limited to the hoses, pump, nozzle, fittings, and tank have been selected for their quality, safety, and intended application. Any alteration or replacement of any part by other than CrossRoads parts could jeopardize the integrity of the system and may result in serious injury or even death.

If your fueling system is not working properly or you need additional information on the use of your system contact your authorized CrossRoads dealer immediately or call CrossRoads directly.

Portable Containers

When dispensing gasoline into a container, use only approved portable containers and place it on the ground to avoid a possible static electricity ignition of fuel vapors. Never fill a container while the container is inside a vehicle, a car trunk, the bed of a pickup truck or the floor of a trailer.

» When fueling a portable container, manually control the nozzle valve throughout the filling process. Fill a portable container slowly to decrease the chance of static electricity buildup and minimize spilling.

⚠WARNING

Fuel-soaked rags or other materials contain flammable and/or explosive fuel vapors and other hazardous substances. Clean up materials should be temporarily stored in a nonflammable, vapor-tight container until proper disposal facilities are available. Do not store flammable clean up rags or materials inside the trailer, inside any other vehicle or near any source of flame or ignition.

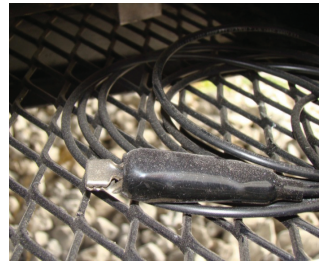
Sidewall vent - Squeeze handle and rotate to open/close

⚠CAUTION

If a fuel spill occurs in the storage area of the trailer, open the windows and sidewall vents, and wipe up the fuel with cloth or paper towels. Dispose of the towels in a suitable hazardous waste container. Do not hose out the trailer with water. Clean the fuel spill areas with a grease/oil dissolving cleaner such as 409®. Thoroughly dry the spill areas.

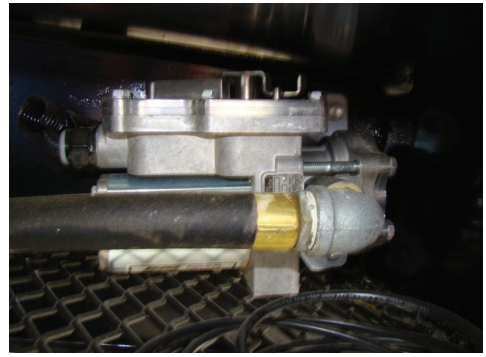
- Keep the fuel nozzle in contact with the rim of the container opening while refueling.
- Fill container no more than 95 percent full to allow for expansion.
- Place cap tightly on the container after filling - do not use containers that do not seal properly.
- Store gasoline only in approved containers. Never store gasoline in glass or any other unapproved container.
- If gasoline spills on the container, clean up the spill immediately.
- When transporting gasoline in a portable container make sure it is secured against tipping and sliding, and never leave it in direct sunlight or in the trunk of a car.

Control Panel (Configuration and control location differs depending on model)



Ground Clip

Dispense fuel



Fuel pump emergency shutoff switch (located on frame rail).

The emergency shutoff switch will disconnect power to the fuel transfer system.

Garage Area

Any motorized vehicle or any motorized equipment powered with flammable liquid can cause fire and explosion or asphyxiation if stored or transported within the recreation vehicle. To reduce the risk of fire, explosion or asphyxiation:

1. Do not allow passengers to ride inside the internal combustion engine vehicle storage area while vehicles are present.

2. Do not allow occupants to sleep in the vehicle storage area while vehicles are present.

3. Doors and windows in walls of separation (if installed) must be closed while vehicles are present.

4. Run fuel out of engine after shutting off fuel at the tank.

5. Do not store or transport supplementary motor fuel within this vehicle.

6. Ventilate the interior of the vehicle to reduce the risk of fire, explosion or asphyxiation.

7. Do not operate gas appliances, pilot lights, or electrical equipment when motorized vehicles or motorized equipment are inside the vehicle.

8. Do not operate motorized vehicles while the rear door is closed.

Failure to comply could result in an increased risk of fire, explosion, asphyxiation, death or serious injury.

Loading an internal combustion engine or other materials inside of cargo storage area will affect the weight distribution of the recreation vehicle. Adding weight to the unit behind the rear axle will reduce the weight to the front axle. This may adversely affect handling of recreation vehicle while in transit. Adding the weight behind the rear axle also adds to the weight load on the rear axle. Do not over load the rear axle weight rating.

Cohabiting with an internal combustion engine vehicle can be hazardous to your health. Fumes from fuel can cause fire, explosion, or asphyxiation.

Liftgate

This is not a personnel lift. Do not stand on or near lift when in motion. Serious injury or death may occur.

Fold-Down Ramp

Keep all personnel clear of ramp working area while raising or lowering.

Keep all objects clear of pinch points when raising and lowering platform.

Keep the loading area clean and free of clutter and debris. Keep the ramp and floor dry by cleaning up all spilled water, oil and fuel as soon as possible.

The fold-down ramp gives complete access to the cargo area. When lowered, the ramp allows easy loading of rolling cargo, bicycles, motorcycles, ATV's and other small vehicles.

Always wear shoes that provide good traction, and do not wear sandals or other types of slip-on footwear when ascending or descending the ramp.

NOTE: Refer to the fold-down ramp manufacturer's operations manual for detailed information regarding the proper usage of the fold-down ramp.

Appendix

For assistance with this manual, warranty information or information on CrossRoads Products, please contact your dealer or visit us on the web or contact CrossRoads RV Company Retail Customer Service.

Address:
CrossRoads RV Company Customer Service Dept.
1115 West Lake St.
Topeka, IN 46571

Fax:	260-593-2815
Phone:	260-593-2866
E-Mail:	service@crossroadsrv.com or service1@crossroadsrv.com
Web:	www.crossroadsrv.com

Business Hours:
8:30AM - 5:00PM (EST) Monday - Friday

Exterior Pre-Travel Checklist

- Fill the Propane bottles
- Empty the holding tanks
- Connect the trailer to the tow vehicle and test all of the exterior lights
- Inspect the awning and ensure that it is properly retracted and secured for travel. It is recommended that a tie wrap be used on the awning arms preventing the possibility of the awning deploying while in travel.
- Inspect all exterior baggage doors and hatches ensuring they are locked
- Inspect the tires and check the pressures. Refer to Chapter 9
- Loosen and Torque the lug nuts. Refer to Chapter 9

- Connect the breakaway switch and test the brakes on the trailer. Adjust the tow vehicle brake controller in accordance with the manufacturer's recommendations
- Secure the rear leveling jacks in the "up" position
- Position the battery disconnect to the on position. This is required to engage the trailer's brakes in the event of an emergency
- Ensure the steps are retracted

Interior Pre-Travel Checklist

- Close all vents and windows
- Place the television antenna "down" position
- Retract the slide rooms
- Inspect the interior of the unit ensuring that all cabinet, interior, and the shower doors are closed and secured
- Secure all loose items in storage compartments
- Ensure that the travel latch is closed on the refrigerator
- Test the smoke, carbon monoxide and Propane alarms.

Battery

- Check the electrolyte levels in the battery cells. Refer to Chapter 5
- Clean the battery terminals and ensure they are securely tightened. Refer to Chapter 5

Exterior

- Wash and wax the exterior of the coach at least monthly. Pay particular attention to the graphics when washing and waxing. Power buffers and high pressure washers can remove or damage the graphics. This type of damage is not covered under the warranty. Refer to Chapter 9
- Inspect the seals around the windows, doors and appliance vents. Clean and reseal as required. Refer to Chapter
- Remove debris from the window weep holes. Refer to Chapter

Frame and Chassis

- Inspect the frame for signs of corrosion. Clean and lightly sand any corroded areas and touch them up with good quality paint. Refer to Chapter 9
- Inspect the steps for corrosion. Clean and touch up any corroded areas. Lubricate the pivot points on the steps. Refer to Chapter 9
- Check the tire pressure. Refer to Chapter 9
- Generator - Review the preventative maintenance requirements in the manufacturer's owner manual. Refer to Chapter 4

Plumbing

- Flush the waste water system and sanitize. Refer to Chapter 7
- Flush the water heater tank. Refer to Chapter 7
- Replenish the water tank air pocket. Refer to Chapter 7
- Winterize your coach prior to the onset of freezing temperatures. During extreme freezing temperatures it is recommended that the unit be winterized. Damage to the plumbing system due to freezing is not covered under the warranty.

Roof

- Remove all debris from the roof and thoroughly clean using a mild detergent. Refer to Chapter 9
- Inspect the roof seals for signs of deterioration. Reseal areas as required. Refer to Chapter 9

Glossary of Common RV Terms

ACCESSORY WEIGHT: The combined weight (in excess of those standard items which may be replaced) of automatic transmission, power steering, power brakes, power windows, power seats, radio and heater, to the extent that these items are available as factory-installed equipment (whether installed or not).

AC ELECTRICITY: Alternating Current. Standard Household 110 Volt AC current.

ANODE ROD: Part of the water heater that attracts impurities in the water that cause corrosion.

BEAD: The part of the tire that is made of steel wires, wrapped or reinforced by ply cords and that is shaped to fit the rim.

BEAD SEPARATION: This is the breakdown of the bond between components in the bead.

BIAS PLY TIRE: A pneumatic tire in which the ply cords that extend to the beads are laid at alternate angles substantially less than 90 degrees to the center line of the tread.

BLACK TANK: The holding tank into which the toilet directly drains.

BLACK WATER: The term associated with sewage contained within the black tank.

BRAKE CONTROLLER: Device located under the dash of a towing vehicle that controls the braking system of the fifth-wheel.

BTU: The measurement of the amount of heat required to raise the temperature of one (1) pound of water, one (1) degree F.

CARCASS: The tire structure, except tread and sidewall rubber which, when inflated, bears the load.

CHUNKING: The breaking away of pieces of the tread or sidewall.

CITY WATER: Refers to exterior water source, not water from the fresh water tank that you hook up to at campgrounds. “City Water” refers to pulling water from a central source (like in a city).

COLD INFLATION PRESSURE: The pressure in the tire before you drive.

CONDENSATION: The result of warm humid air coming in contact with cold glass also known as ‘Sweat’.

CONVERTER: Device that converts 110V AC to 12V DC.

CURBSIDE: Term used to refer to the side of your coach, which faces the curb or shoulder when parked. Also called DOOR SIDE (the main entrance door) or OFFROAD SIDE.

DC ELECTRICITY: Direct Current. Also termed Battery Power. Used to run all 12 Volt powered systems or lighting.

DRY CAMPING: Refers to camping using only the resources within your unit and without amenities such as city water hook-ups, electrical hook-ups, etc., often provided at commercial campsites.
DSI IGNITION: Direct Spark Ignition – The method of lighting a main burner on a Propane fired appliance.

COLD INFLATION PRESSURE: The pressure in the tire before you drive.

CORD: The strands forming the plies in the tire.

CORD SEPARATION: The parting of cords from adjacent rubber compounds.

CRACKING: Any parting within the tread, sidewall, or inner liner of the tire extending to cord material.

CT: A pneumatic tire with an inverted flange tire and rim system in which the rim is designed with rim flanges pointed radially inward and the tire is designed to fit on the underside of the rim in a manner that encloses the rim flanges inside the air cavity of the tire.

CURB WEIGHT: The weight of a motor vehicle with standard equipment including the maximum capacity of fuel, oil, and coolant, and, if so equipped, air conditioning and additional weight optional engine.

DUCTED AC: Air conditioning distributed through a ducting system.

DUCTED HEAT: Warm air distributed through a ducting system.

DUAL ELECTRICAL SYSTEM: Coach equipped with appliances and lights, which operate on 12V power when self-contained, and with a converter, on 110 AC when in campgrounds or run off of a generator.

DUMP STATION: Term used for locations to drain the waste holding tanks (gray and black tanks). In most states, it is illegal to dump your tanks anywhere except at dump stations.

DUMP VALVE: Another name for the T-Handle used to drain the black and gray tanks.

EGRESS WINDOW: Term for the emergency exit windows within recreational vehicles: Usually identified by a red handles or levers.

EXTRA LOAD TIRE: A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

FULL HOOK-UP SITE: A Campsite that offers full amenities: City water, sewer, and electrical hook ups – many have cable and phone available.

GALLEY TANK: A gray water holding tank used specifically for the kitchen waste water.

GENERATOR: Powered by Propane gas, generates 110 Volt power.

GRAY TANK: the waste holding tank into which water from the kitchen and bath sinks, shower and tub drains.

GRAY WATER: Water drained into the gray holding tank.

GROOVE - The space between two adjacent tread ribs.

GROSS AXLE WEIGHT RATING (GAWR): Maximum amount of weight (in lbs.) that can be placed on the axle.

GROSS COMBINED WEIGHT RATING (GCWR): Maximum load weight (in lbs.) allowed for the coach and tow vehicle.

GROSS VEHICLE WEIGHT RATING (GVWR): Maximum load weight (in lbs.) allowed for the vehicle.

GROSS Fifth-Wheel WEIGHT (GTW): Weight of the fully loaded coach in its actual towing condition.

HITCH WEIGHT: Amount of a coach's weight that rests on the tow vehicle's hitch.

HOLDING TANKS: Refers to the tanks typically known as fresh water, gray and black, where the water is held.

HOOK-UPS: Where you connect to a campground's facilities.

INNERLINER: The layer(s) forming the inside surface of a tubeless tire that contains the inflating medium within the tire.

INNERLINER SEPARATION: The parting of the innerliner from cord material in the carcass.

INTENDED OUTBOARD SIDEWALL: The sidewall that contains a white-wall, bears white lettering or bears manufacturer, brand, and/or model name molding that is higher or deeper than the same molding on the other sidewall of the tire or the outward facing sidewall of an asymmetrical tire that has a particular side that must always face outward when mounted on a vehicle.

LIGHT TRUCK (LT) TIRE: A tire designated by its manufacturer as primarily intended for use on lightweight trucks or multipurpose passenger vehicles.
Load rating - The maximum load that a tire is rated to carry for a given inflation pressure.

NET CARRYING CAPACITY (NCC): Maximum weight without exceeding the GVWR. Also referred to as 'Payload Capacity'

LOAD RATING: The maximum load that a tire is rated to carry for a given inflation pressure.

LOW POINT/LOW POINT DRAIN: Lowest point in the plumbing system. Drain valves are placed at these points for sewage dumping.

Propane GAS: Petroleum Gas – Used to fuel appliances.

MAXIMUM LOAD RATING: The load rating for a tire at the maximum permissible inflation pressure for that tire.

MAXIMUM PERMISSIBLE INFLATION PRESSURE: The maximum cold inflation pressure to which a tire may be inflated.

MAXIMUM LOADED VEHICLE WEIGHT: The sum of curb weight, accessory weight, vehicle capacity weight, and production options weight.

MEASURING RIM: The rim on which a tire is fitted for physical dimension requirements.

NON-PNEUMATIC RIM: A mechanical device which, when a non-pneumatic tire assembly incorporates a wheel, supports the tire, and attaches, either integrally or separably, to the wheel center member and upon which the tire is attached.
NON-PNEUMATIC SPARE TIRE ASSEMBLY: A non-pneumatic tire assembly intended for temporary use in place of one of the pneumatic tires and rims that are fitted to a passenger car in compliance with the requirements of this standard.

NON-PNEUMATIC TIRE: A mechanical device which transmits, either directly or through a wheel or wheel center member, the vertical load and tractive forces from the roadway to the vehicle, generates the tractive forces that provide the directional control of the vehicle and does not rely on the containment of any gas or fluid for providing those functions.

NON-PNEUMATIC TIRE ASSEMBLY: A non-pneumatic tire, alone or in combination with a wheel or wheel center member, which can be mounted on a vehicle.

NORMAL OCCUPANT WEIGHT: This means 68 kilograms (150 lbs.) times the number of occupants specified in the second column of Table I of 49 CFR 571.110.

OCCUPANT DISTRIBUTION: The distribution of occupants in a vehicle as specified in the third column of Table I of 49 CFR 571.110.

OPEN SPLICE: Any parting at any junction of tread, sidewall, or innerliner that extends to cord material.

OUTER DIAMETER: The overall diameter of an inflated new tire.

OVERALL WIDTH: The linear distance between the exteriors of the sidewalls of an inflated tire, including elevations due to labeling, decorations, or protective bands or ribs.

PILOT: Small flame that is used to ignite the main burner of a Propane-fired appliance.

PIN WEIGHT: The vertical trailer load supported by the king pin of a fifth-wheel hitch.

PLY: A layer of rubber-coated parallel cords.

PLY SEPARATION: A parting of rubber compound between adjacent plies.

PNEUMATIC TIRE: A mechanical device made of rubber, chemicals, fabric and steel or other materials, that, when mounted on an automotive wheel, provides the traction and contains the gas or fluid that sustains the load.

PRODUCTION OPTIONS WEIGHT: The combined weight of those installed regular production options weighing over 2.3 kilograms (5 lbs.) in excess of those standard items which they replace, not previously considered in curb weight or accessory weight, including heavy duty brakes, ride levelers, roof rack, heavy duty battery, and special trim.

PRIMITIVE CAMPSITE: Campsite that offers limited connections. May have city water or electrical available but not both.

PULL-THROUGH SITES: Camp sites that you can pull your recreational vehicle through, eliminating the need to back in.

RADIAL PLY TIRE: A pneumatic tire in which the ply cords that extend to the beads are laid at substantially 90 degrees to the center line of the tread.

RECOMMENDED TIRE INFLATION PRESSURE: This is the inflation pressure provided by the vehicle manufacturer on the Tire Information label and on the Certification / VIN tag.

REINFORCED TIRE: A tire designed to operate at higher loads and at higher inflation pressures than the corresponding standard tire.

RIM: A metal support for a tire or a tire and tube assembly upon which the tire beads are seated.

RIM DIAMETER: This means the nominal diameter of the bead seat.

RIM SIZE DESIGN: This means the rim diameter and width.

RIM TYPE DESIGNATION: This means the industry of manufacturer's designation for a rim by style or code.

RIM WIDTH: This means the nominal distance between rim flanges.

ROADSIDE: Refers to the side of the unit that faces the road when parked. Also commonly referred to as "Off DOOR SIDE.".

RV: Short for Recreational Vehicle.

RVIA: Recreational Vehicle Industry Association

SECTION WIDTH: The linear distance between the exteriors of the sidewalls of an inflated tire, excluding elevations due to labeling, decoration, or protective bands.

SHORE LINE: The electrical cord that connects 110V from an exterior outlet (such as campgrounds) to the RV. Also called 'Power Cord'

SHORE POWER: The 110V outlet that connects to the Shore Line.

SIDEWALL: That portion of a tire between the tread and bead.

SIDEWALL SEPARATION: The parting of the rubber compound from the cord material in the sidewall.

TEST RIM: The rim on which a tire is fitted for testing, and may be any rim listed as appropriate for use with that tire.

TREAD: That portion of a tire that comes into contact with the road.

TREAD RIB: A tread section running circumferentially around a tire.

TREAD SEPARATION: Pulling away of the tread from the tire carcass.

TREAD-WEAR INDICATORS (TWI) - The projections within the principal grooves designed to give a visual indication of the degrees of wear of the tread.

UNLOADED VEHICLE WEIGHT (UVW): Weight of the unit without adding fuel, water, propane, supplies and passengers. Also referred to as 'Dry Weight'

VEHICLE CAPACITY WEIGHT: The rated cargo and luggage load plus 68 kilograms (150 lbs.) times the vehicle's designated seating capacity. Vehicle maximum load on the tire - The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

VEHICLE MAXIMUM LOAD ON THE TIRE: The load on an individual tire that is determined by distributing to each axle its share of the maximum loaded vehicle weight and dividing by two.

VEHICLE NORMAL LOAD ON TIRE: The load on an individual tire that is determined by distributing to each axle its share of the curb weight, accessory weight, and normal occupant weight (distributed in accordance with Table I of CRF 49 571.110) and dividing by 2.

WEATHER SIDE: The surface area of the rim not covered by the inflated tire.

WET WEIGHT: Weight of the coach with fuel, fresh water and Propane tanks full.

WHEEL CENTER MEMBER: In the case of a non-pneumatic tire assembly incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic rim and provides the connection between the non-pneumatic rim and the vehicle; or, in the case of a non-pneumatic tire assembly not incorporating a wheel, a mechanical device which attaches, either integrally or separably, to the non-pneumatic tire and provides the connection between tire and the vehicle.

WHEEL HOLDING FIXTURE: The fixture used to hold the wheel and tire assembly securely during testing.

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Inspection and Service Certification VIN_____

It is the owner's responsibility to have the following inspections and service items performed. These inspections and services are at the owner's expense and failure to do so will void your structural warranty. These inspections and services must be performed annually by a qualified CrossRoads RV dealership. A 30-day grace period will apply to all annual inspections. Please have the Inspection and Service Certification Form completed by the qualified CrossRoads RV dealer when service is completed. **Keep this original Inspection and Service Certification and fax/mail a copy to CrossRoads RV Service Department annually when service is completed.**

Dealer Service Department:

After performing the following services, please complete the appropriate area below for warranty validation.

- ❑ 1. Inspect roof membrane for damage (cuts, tears, etc.) and repair as required.
- ❑ 2. Inspect lap sealant on all roof appliances for cracks, etc. Replace or add sealant as required.
- ❑ 3. Inspect sealant on all windows and re-seal as required.
- ❑ 4. Inspect all clearance light lenses for cracks and inspect seal around body of light. Replace and reseal as required.
- ❑ 5. Inspect all exterior moldings for cracks in sealant and re-seal as required. Inspect visible screws in molding for rust or breakage. Replace as required. Inspect molding butt seams for sealant and apply as required.
- ❑ 6. Investigate for the presence of condensation in the roof cavity and document below. If condensation is present, correct as required and re-instruct customer as to the hazards of condensation.

1st Year

Date:	Dealer:
Comments:	
Signed:	

2nd Year

Date:	Dealer:
Comments:	
Signed:	

3rd Year

Date:	Dealer:
Comments:	
Signed:	

4th Year

Date:	Dealer:
Comments:	
Signed:	

5th Year

Date:	Dealer:
Comments:	
Signed:	

The undersigned Manufacturer warrants the structural integrity of each Aluminum Framed Recreational Vehicle, specifically floor, walls and roof from defect in construction for a period of FIVE (5) YEARS starting from the date of delivery to the original purchaser. Water damage resulting from condensation and/or lack of proper maintenance is not warranty.

Manufacturer's obligation under this warranty is expressly limited to repairing or replacing any part or parts of the floor, walls, and roof which shall wihin FIVE (5) YEARS from delivery of such Recreational Vehicle to the original purchaser thereof be determined to the satisfaction of the Manufacturer upon examination to have thus been defective.

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